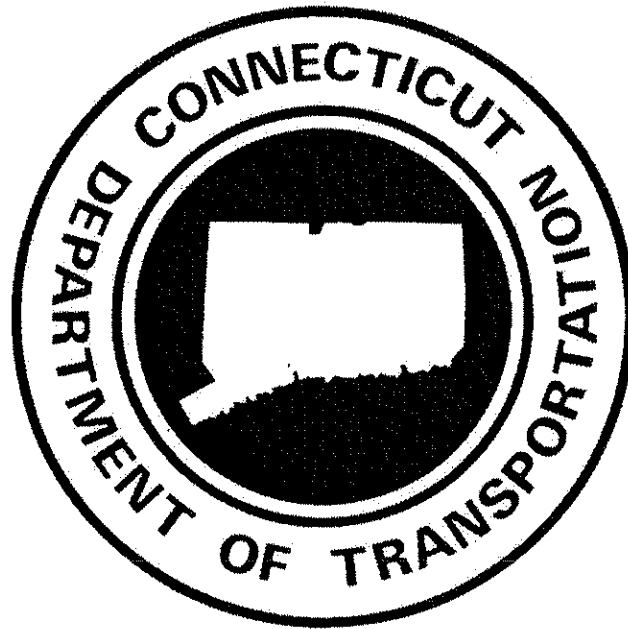


# **STORMWATER POLLUTION CONTROL PLAN**

**Reconstruction of State Route 31  
Coventry, Connecticut  
Project No. 32-130**



The State of Connecticut  
Department of Transportation – District 1  
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Appendix B	Velocity Dissipation Calculations
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## **ATTACHMENTS**

Attachment 1	Site Location Map
Attachment 2	Site Plans

## 1.0 INTRODUCTION

The Connecticut Department of Transportation (ConnDOT) is proposing the reconstruction of approximately 2000 feet of State Route 31 (Main Street) through the center of historic South Coventry, Connecticut. The reconstruction shall begin approximately 300 feet northwest of the intersection of Route 275 (Stonehouse Road) and end approximately 900 feet east of Monument Hill Road, in the vicinity of the South Coventry First Congregational Church. Intersecting approaches (Stonehouse Road/Lake Street, and Monument Hill Road) will be reconstructed for lengths that vary from stubs to 175 feet. The entire project will include drainage improvements. Please see Attachment 1 for a site location map.

This Stormwater Pollution Control Plan (SWPCP) has been prepared in accordance with the Connecticut Department of Energy and Environmental Protection (DEEP) "General Permit for the Discharge of Stormwater and Dewatering Wastewaters Associated with Construction Activities", DEEP-WPED-GP-015 (hereinafter the "General Permit"). ConnDOT has filed registration under the General Permit with DEEP and is therefore the "Permittee". As this SWPCP is a required component of the General Permit registration, all project participants who are involved with "site" construction (e.g. Construction Manager, General Contractor, Contractor, Subcontractors, etc.) are required to certify to this SWPCP and perform the actions defined by this SWPCP throughout all phases of construction. ConnDOT, as Permittee, will be responsible for compliance with applicable portions of this SWPCP following the completion of construction and turn-over of the new facility.

This SWPCP is intended to be used in concert with technical specification Section 01 5713 – Temporary Erosion and Sedimentation Controls and the Erosion and Sedimentation Control Plans included in Attachment 2. This SWPCP is intended to reduce and/or eliminate to the extent achievable using control measures that are technologically available and economically practicable and achievable in light of best industry practice the following: (1) pollution caused by soil erosion and sedimentation during and after construction; and (2) stormwater pollution caused by use of the site after construction is completed.

## 2.0 SITE PLAN

The project site is located within the South Coventry Historic District in Coventry, Connecticut and is bounded on all sides by private or town properties. The work area is comprised of approximately 4.97 acres.

Roadway work area topography in the vicinity of the route 31 and route 270 intersection slopes to the southeast, with reconstruction starting around elevation 540 at station 10+00. The slope proceeds downward to the southeast around the proposed curve and continues east through the intersection with Monument Hill Road at around elevation 468 ( $\pm$ Station 21+25). The low point of the roadway work area occurs at station 23+50, adjacent to the fire pond at approximate elevation 455. From here the roadway continues relatively flat to the end of the reconstruction at station 30+50 and approximate elevation 452.

Site drawings included in Attachment 2 provide the following information:

- Drainage patterns
- Approximate slopes anticipated after major grading activities
- Areas of soil disturbance
- Location of major structural and non-structural controls
- The location of areas where stabilization practices are expected to occur
- Areas which will be vegetated following construction
- Monitored outfalls

### **3.0 SITE DESCRIPTION**

#### **3.1 Nature of the Construction Activity**

The primary objective of this project is to eliminate a very sharp curve on Route 31 just south of Route 275, which is the cause of numerous accidents. ConnDOT designed the project with a "context sensitive" approach, which includes sidewalks and streetscape improvements. An "Access Management Plan" will also be implemented as part of the project, to reduce the number of curb cuts and control their location and design.

The reconstruction project will include full depth reconstruction, milling and overlay, horizontal and vertical realignment (most notably, the sharp curve 500 feet south of Route 275), as well as drainage improvements and other improvements incidental to the construction of the road, such as sidewalks, retaining walls, utility pole relocation, curbs, and parking lots.

#### **3.2 Site Area and Site Area Disturbance**

The site is 4.97 acres in size. It is anticipated that the entire 4.97 acres will be disturbed by construction activities.

#### **3.3 Runoff Coefficients**

The estimated average runoff coefficient of the site after construction activities are completed is 0.73.

#### **3.4 Receiving Water(s)**

If not infiltrated into the ground, wastewaters discharged under the General Permit will be collected by the ConnDOT operated storm drainage system and will discharge to the Mill Brook watercourse through one of three Main Outlets: MO-1 through MO-3 (Subregional Basin No. 3105-00). Mill Brook discharges to Decew Pond, south of Depot Road in South Coventry and eventually enters Eagleville Brook, which ultimately discharges to the Thames River (Drainage Basin No. 3).

#### **3.5 Wetlands**

There are wetlands associated with the "Trolley Way" drainage ditch and Mill Brook that crosses underneath the site. In total, the wetlands constitute 0.08 acres (approximately 3,500 square feet) within the limits of work.

#### 4.0 CONSTRUCTION SEQUENCING

The contractor will have the ability, and the responsibility, to perform the work in phases, so as to minimize disturbance at any one time, minimize disruption to the town and state roadway system, minimize disruption to local businesses, and perform the work in an efficient manner. It is the contractor's responsibility to determine the limit of each phase of work, and comply with the maximum disturbance criteria.

Each phase of construction, regardless of the number of sequences it contains, requires a preconstruction meeting that should include ConnDOT, the contractor, utility representatives, and other agents who have responsibility and authority for the implementation, operation, monitoring and maintenance of the erosion and sediment (E&S) controls. The purpose of the preconstruction meeting is to make all responsible parties aware of the project's needs so that resources can be properly distributed and to identify limitations and restrictions. The preconstruction meeting shall identify modifications needed to the construction sequence and application of special treatments. Included in the preconstruction meeting agenda, at a minimum, shall be a review of plans, permit conditions, the contractors' sequence and schedules for construction, site restrictions and other special needs.

The following sequence is provided as a generic roadway construction guideline applicable for each individual phase. This generic phasing shall be adjusted, by the contractor, to meet project-specific phase needs and conditions. It is also recognized that work will not proceed without delays. When work is suspended within a phase, the contractor shall deploy additional erosion and sediment controls as may be required to secure the site. Erosion and sediment controls shall be installed and maintained as dictated by the plan set (Erosion and Sedimentation Control Sheets) and Section 5.0 (Controls) of this Plan. If additional erosion and sediment controls are required due to specific site conditions, it is the contractor's responsibility to provide controls that are sufficient to prevent the removal and transportation of sediment off site to resource areas, that area also satisfactory to the Engineer.

The generic sequence of construction activities for each phase will generally occur as follows:

1. Preconstruction meeting.
2. Install Erosion and Sediment Controls.
3. Construction activities.
4. Stabilize area.
5. Remove Erosion and Sediment Controls.

In order to give the contractor the maximum amount of flexibility, the plans show locations of perimeter erosion control barriers. It is the contractor's responsibility to provide additional controls within the project limits to prevent the removal and transportation of sediment off site and to resource areas. In accordance with ConnDOT Form 816 Best Management Practices (Section 1.10.03 – Water Pollution Control), no construction shall proceed until (i) the Contractor has submitted in writing to the Engineer its erosion and sedimentation control plan (for each phase); (ii) the Engineer has given in writing his approval of said plans; and (iii) the Contractor has installed all erosion and sedimentation controls called for by said plans.

If the construction sequencing activities create an area of disturbance between two (2) acres and five (5) acres per each discharge point, the contractor must submit to the engineer a revised SWPCP for review and approval. The SWPCP must include locations of the temporary sedimentation trap installed prior to each discharge point with a capacity to contain 134 cubic yards per acre of material in accordance with the 2002 Guidelines. The contractor shall provide

an inspection and maintenance plan for the temporary sedimentation trap as part of the amended SWPCP.

The tentative schedule proposed by ConnDOT for the reconstruction of route 31 is provided as follows:

1. Relocation and flattening of the sharp curve: June – November, 2015
2. Installation of utility infrastructure: July 2015 – May 2016
3. Roadway Reconstruction: May – August, 2016
4. Sidewalk and streetscape construction: July – September, 2016
5. Installation of Parking Lots: July – September, 2016
6. Painting, signing, landscaping, finish-work: August – October, 2016

The total project construction schedule is set from May, 2015 through November, 2016; approximately 76 weeks.

## **5.0 STORMWATER CONTROL MEASURES**

Per the General Permit, this SWPCP must address interim and permanent stabilization practices to address pollution caused by soil erosion and sedimentation during construction, and soil erosion and sedimentation following construction. The project's erosion and sedimentation controls and stormwater management systems have been designed to address both short-term and long-term stormwater quality.

The project's Erosion and Sediment Control Plans include many of the measures indicated below. However, the measures specified on the plans are the minimum requirements for erosion and sediment control at the project, and are shown in general size and location only. All contractors performing site work on the project, construction managers who may engage contractors on the project, and other contractor entities who may have authority over erosion and sedimentation control measures at the project are responsible for ensuring that all measures are configured and constructed in a manner that will minimize erosion of soils and prevent the transport of sediments and other pollutants to any resource areas. In general terms, all entities performing work on the site have a responsibility to minimize the area of exposed soil, control run-off rate and direction, and provide for rapid stabilization of exposed areas.

### **5.1 Erosion and Sediment Controls**

During construction, stormwater run-off is a concern due to the excess amount of exposed areas that do not have vegetation or other cover to prevent the removal and transportation of sediment to resource areas. The primary function of erosion and sedimentation controls, as defined by the 2002 "Connecticut Guidelines for Soil Erosion and Sediment Control" (hereinafter the "2002 Guidelines") is to, "absorb erosional energies and reduce run-off velocities that force the detachment and transport of soil and/or encourage the deposition of eroded soil particles before they reach any sensitive area." The project addresses the short-term concerns by providing erosion control measures in the form of Erosion and Sediment Control Plans (refer to Attachment 2). The proposed erosion and sedimentation controls consider the specific characteristics of the site and the anticipated construction activities, and have been designed in accordance with the 2002 Guidelines.

#### **5.1.1 Soil Stabilization and Protection**

##### **5.1.1.1 Erosion Control Barriers**

*Reference: Section 5-11 of the 2002 Guidelines*

Prior to any construction activity, hay bales, silt fence, or combination hay bale/silt fence barriers will be placed at the limit of work where run-off potential exists, at other key locations within the site where run-off potential exists, and around stockpiles or stockpile areas. These barriers will be inspected once every seven calendar days and within 24 hours after every rainfall generating a discharge. Repair or replace damage or displaced fencing as required. Collected silt will be removed when one-half the barrier height is reached.

### Haybales

Use hay bales for the following:

- To intercept and detain small amounts of sediment from small disturbed areas.
- To decrease the velocity of sheet flows.
- To redirect small volumes of water away from erodible soils.
- To settle and assist in filtering waters discharged from pumping operations.

Applicability-

- Below small disturbed areas where the drainage area (disturbed and undisturbed) is less than 1 acre in size.
- Above disturbed slopes to direct surface water away from erodible areas where the drainage area (disturbed and undisturbed) is less than 1 acre in size.
- Where protection and effectiveness is required for less than 3 months.
- Where sedimentation will reduce the capacity of storm drainage systems or adversely affect adjacent areas, watercourses and other sensitive areas.
- Not for use in drainageways, except in special cases where it is applied with other measures.
- Not intended for use in streams.

### Silt Fence

Use silt fence for the following:

- To intercept and retain sediment from disturbed areas.
- To decrease the velocity of sheet flows and low volume concentrated flows.

Applicability-

- Below small disturbed areas where the contributing drainage area (disturbed and undisturbed) is less than 1 acre in size.
- At storm water drainage inlets and catch basins where sedimentation will reduce the capacity of storm drainage systems or adversely affect adjacent areas, watercourses and other sensitive areas.
- Not for use in areas where rock, frozen ground or other hard surface prevents proper installation of the barrier.
- Prohibited from use in drainageways whose flow is supported by ground water discharge.

### 5.1.1.2 Temporary Seeding

*Reference: Section 5-3-2 of the 2002 Guidelines*

Areas that will remain disturbed but inactive for at least thirty days will receive temporary seeding or soil protection within seven (7) days in accordance with the 2002 Guidelines. Areas that will remain disturbed beyond the seeding season as identified in the 2002 Guidelines, will receive long-term, non-vegetative stabilization and protection (see below) sufficient to protect the site through the winter. In all cases, stabilization and protection measures shall be implemented as soon as possible in accordance with the 2002 Guidelines or as approved by DEEP.

It is important to note that temporary seeding will not provide the same level of protection that permanent vegetation will provide. Temporary seeding mixtures do not develop a "turf" or "sod." Temporary seeding does not generally receive the same level of maintenance as permanent seeding.

Temporary seeding will be conducted per the table below:

<b>Temporary Erosion Control Seeding</b>				
Species (Note 1)	Application Rate, Pounds Per Acre	Application rate, Pounds Per 1,000 sf	Optimum Seed Depth, inches (Note 2)	Optimum Seeding Dates (Note 3)
Annual ryegrass <i>Lolium multiflorum</i>	40	1.00	0.5	3/1 - 6/15 and 8/1 - 10/15
Perennial ryegrass <i>Lolium perenne</i>	40	1.00	0.5	3/15 - 7/1 and 8/1 - 10/15
Winter Rye <i>Secale cereale</i>	120	3.00	1.00	4/5 - 7/1 and 8/15 - 10/15
Oats <i>Avena sativa</i>	86	2	1	3/1 - 6/15 and 8/1 - 9/15
Winter Wheat <i>Triticum aestivum</i>	120	3	1	4/15 - 7/1 and 8/15 - 10/15
Millet <i>Echinochloa crusgalli</i>	20	.5	1	5/15 - 7/15
Sudangrass <i>Sorghum sudanese</i>	30	.7	1	5/15 - 8/1
Buckwheat <i>Fagopyrum esculentum</i>	15	.4	1	4/1 - 9/15
Weeping lovegrass <i>Eragostis cymbula</i>	5	.2	.25	6/1 - 7/1
ConnDOT All Purpose Mix	150	3.4	.5	3/1 - 6/15 and 8/1 - 10/15

1 - Listed species may be used in combinations to obtain a broader time spectrum. If used in combinations, reduce each species planting rate by 20% of that listed.

2 - Seed at twice the indicated depth for sandy soils

3 - May be planted throughout summer if soil moisture is adequate or can be irrigated. Fall seeding may be extended 15 days in the coastal towns.

#### 5.1.1.3 Soil Stabilization- Mulches

*Reference: Section 5-4-8 of the 2002 Guidelines*

Structural (non-living) soil stabilization is intended to protect the soil surface on a temporary basis without the intention of promoting plant growth.

##### Applicability-

- When grading of the disturbed area will be suspended for a period of 30 or more consecutive days, but less than 5 months, disturbed areas will be stabilized within 7 days of the suspension of grading through the use of mulch, non-bituminous tackifiers, erosion control netting, or other approved materials appropriate for use as a temporary soil protector.
- For surfaces that are not to be reworked within 5 months but will be reworked within 1 year, use temporary seeding, seeding-type mulch (hay, straw, or cellulose fiber) or when slopes are less than 3:1, wood chips, bark chips or shredded bark.

##### Mulch Types-

Hay - The dried stems and leafy parts of plants cut and harvested, such as alfalfa, clovers, other forage legumes and the finer stemmed, leafy grasses. The average stem length should not be less than 4 inches. Hay that can be windblown should be anchored to hold it in place.

Straw - Cut and dried stems of herbaceous plants, such as wheat, barley, cereal rye, or brome. The average stem length should not be less than 4 inches. Straw that can be windblown should be anchored to hold it in place.

Wood Chips - Chipped wood material from logs, stumps, brush or trimmings including bark, stems and leaves having a general maximum size of 0.5 inch by 2 inches and free of excessively fine or long stringy particles as well as stones, soil and other debris. No anchoring is required. If seeding is performed where wood chips have been previously applied, prior to the seeding the wood chips should be removed or tilled into the ground and additional nitrogen applied. Nitrogen application rate is determined by soil test at time of seeding (anticipate 12 lbs. nitrogen per ton of wood chips).

Bark Chips, Shredded Bark - Tree bark shredded as a by-product of timber processing having a general maximum size of 4 inches and free of excessively fine or long stringy particles as well as stone and other debris. Material use is the same as wood chips.

Other Mulch Materials - Other mulch materials may include corn stalks, leaves and other similar materials provided they meet the requirements of the materials in Section 5-4 of the 2002 Guidelines.

#### 5.1.1.4 Soil Stabilization - Blankets/Mats

*Reference: Section 5-4-10 of the 2002 Guidelines*

Erosion control blankets/mats are a manufactured product composed of biodegradable/photodegradable natural or polymer fibers and/or filaments that have been mechanically, structurally or chemically bound together to form a continuous matrix. Their purpose is to provide temporary surface protection to newly seeded and/or disturbed soils to absorb raindrop impact and to reduce sheet and rill erosion and to enhance the establishment of vegetation.

##### Applicability-

- On disturbed soils where slopes are 2:1 or flatter.
- Where wind and traffic generated air flow may dislodge standard, unarmored mulches.

The success of temporary erosion control blankets is dependent upon strict adherence to the manufacturer's installation recommendations. As such, a final inspection should be planned to ensure that the lap joints are secure; all edges are properly anchored and all staking/stapling patterns follow the manufacturer's recommendations. Inspect temporary erosion control blankets at least once a week and within 24 hours of the end of a storm with a rainfall amount of 0.5 inch or greater for failures. Blanket failure has occurred when (1) soils and/or seed have washed away from beneath the blanket and the soil surface can be expected to continue to erode at an accelerated rate, and/or (2) the blanket has become dislodged from the soil surface or is torn. If washouts or breakouts occur, re-install the blanket after re-grading and re-seeding, ensuring that blanket installation still meets design specifications. When repetitive failures occur at the same location, review conditions and limitations for use and determine if diversions, stone check dams or other measures are needed to reduce failure rate. Repair any dislodged or failed blankets immediately.

#### 5.1.1.5 Temporary Filter Inserts

Temporary Filter Inserts are commercially-available geotextile-fabric filters that are configured to fit into the openings of drainage structures. These filters serve as secondary protective measures to trap (filter) sediment that may bypass other control measures and be carried to drainage structure inlets by stormwater run-off during construction. Temporary Filter Inserts will be installed in catch basins and similar drainage structures as secondary protective measures throughout construction. Temporary Filter Inserts will be placed in each existing catch basin and yard drains prior to the start of construction, and in each new catch basin or yard drain during construction. These devices will be removed upon final site stabilization.

Filter inserts will be inspected once every seven (7) calendar days and within 24 hours after every rainfall of 0.5 inches or greater. Replacement of the inserts will be as often as necessary to maintain function of the drainage structure and prevent excessive ponding due to clogged fabric. Ripped or otherwise damaged inserts will be replaced immediately.

#### 5.1.1.6 Stockpile Management

*Reference: Section 4-9 of the 2002 Guidelines*

Stockpile management of topsoil and other types of erodible soils is necessary to prevent unnecessary damage resulting from erosion of stockpile material. Locate stockpiles so that natural drainage is not obstructed. Attempt to maximize the distance of stockpiles from wetlands, watercourses, drainage ways, and steep slopes. When the stockpile is down gradient from a long slope, divert run-off water away from or around the stockpile. Install a geotextile silt fence or hay bale barrier around the stockpile area approximately 10 feet from the proposed toe of the slope. The side slopes of stockpiled material that is erodible should be no steeper than 2:1. Stockpiles that are not to be used within 30 days need to be seeded and mulched immediately after formation of the stockpile. The seed mix used depends upon the stockpiled material and the length of time it is to remain stockpiled. Information gathered from soil borings and soil delineation can be used to plan the type of seed and any soil amendments that are appropriate for the stockpile. After the stockpile has been removed, the site should be graded and permanently stabilized.

Topsoil stockpiles which will be idle for at least 30 days will be stabilized with temporary seed and mulch no later than 7 days from the last use. Small stockpiles may be covered with impervious tarps or erosion control matting in lieu of seeding and mulching.

#### 5.1.2 Structural Measures

Structural measures are intended to 1) divert flows away from exposed soils, and 2) store flows or otherwise limit runoff and minimize the discharge of pollutants from the site. Unless otherwise specifically approved in writing by DEEP, or if otherwise authorized by another state or federal permit, structural measures shall be installed on upland soils.

Diversion measures include Temporary Fill Berm, Water Bar, Temporary Diversion and Permanent Diversion. These measures serve the common function of redirecting and controlling the direction of water flow. Diversions are used to direct runoff away from or around sensitive construction areas and to fragment drainage areas to reduce the need for a Temporary Sediment Trap. Diversions are preferable to other types of man-made storm water conveyance systems because they more closely simulate natural flow patterns and characteristics. Flow velocities are generally kept to a minimum.

Storage measures include Temporary Sediment Traps. The primary function of these measures is to slow the velocity of sediment laden waters enough to allow suspended sediments to drop out of solution. They are intended to provide 75% –90% trap efficiency for a 10 year, 2 hour return frequency storm.

Evolving site conditions will determine what structural measures are necessary, and the following general principles should be applied to their selection and placement:

- Prevent clean water from becoming turbid, by diverting runoff from upslope areas away from disturbed areas. Earth dikes, temporary swales, perimeter dike/swales, or diversions that outlet in stable areas can be used in this capacity.
- Remove sediment from turbid water before the water leaves the site. The method of sediment removal depends upon how the water drains from the site.

Concentrated flow must be diverted to a trapping device so that suspended sediment can be deposited. Dikes or swales that outlet into traps or basins can accomplish this. A storm drain system may be used to convey concentrated sediment laden water only if the system empties into a trap or basin. Otherwise, all storm drain inlets must be protected so that sediment laden water cannot enter the drainage system before being treated to remove the sediment.

- Surface runoff draining in sheet flow must be controlled and treated before the water leaves the site. Straw bale dikes, silt fences, or vegetative buffer strips can be used to treat sheet flow.
- All practices designed and implemented must be properly maintained in order to remain functional. Sediment accumulated in basins and traps must be removed and disposed of in a manner that stabilizes them on the construction site.

#### 5.1.2.1 Diversion - Temporary Fill Berm

*Reference: Section 5-7-3 of the 2002 Guidelines*

The Temporary Fill Berm is a non-engineered measure that is a very temporary berm used at the top of active fill slopes whose drainage area at the point of discharge is less than 3 acres. It is intended to divert run-off from unprotected fill slopes during construction to a stabilized outlet or sediment-trapping facility. Its intended duration of use is less than 5 days for any specific fill berm. The use of a berm starts when it is constructed and ends when new fill is placed. When filling is complete and it is determined that a diversion is needed at the top of fill to protect the fill until it is stabilized then a Temporary Diversion is needed.

Applicability-

- On active earth fill slopes where the drainage area at the top of fill drains toward the exposed slope and where ongoing fill operations make the use of a Permanent Diversion unfeasible.
- Where the intended use is 5 days or less. For use longer than 5 days use Temporary Diversion or other measure.
- Where the drainage area at the point of discharge is less than 3 acres.

#### 5.1.2.2 Diversion - Water Bar

*Reference: Section 5-7-6 of the 2002 Guidelines*

A Water Bar is a channel with a supporting berm on the down slope side constructed across an unpaved roadway, construction access road, driveway, or other access way. Its purpose is to minimize the concentration of sheet flow across and down sloping roadways and access ways, or similar sloping and unstable areas and to shorten the continuous flow length within a sloping right-of-way. Water bar spacing is provided in Table 2

Table 1: Water Bar Spacing	
% Slope of Roadway	Spacing (ft)
1%	400
2%	245
5%	125
10%	78
15%	58

Applicability-

- On construction access road, driveway, log road or other access way.
- Where the drainage area to each separate water bar is less than 1 acre.

Unless the water bar discharges into a heavily vegetated area of sufficient length to adequately filter run-off, discharges should be settled or filtered through a geotextile silt fence, hay bale barrier or temporary sediment trap.

### 5.1.2.3 Temporary Diversion

*Reference: Section 5-7-9 of the 2002 Guidelines*

Temporary diversion is used to divert sheet flow to a stabilized outlet or a sediment-trapping facility, to direct water originating from undisturbed areas away from areas where construction activities are taking place, and to fragment disturbed areas thereby reducing the velocity and concentration of run-off. When used at the top of a slope, the structure protects exposed slopes by directing run-off away from the disturbed areas. When used at the base of a disturbed slope, the structure protects adjacent and downstream areas by diverting sediment-laden run-off to a sediment trapping facility. Temporary diversions must be installed as a first step in the land-disturbing activity and must be functional prior to disturbing the land they are intended to protect.

Applicability-

- Where the drainage area at the point of discharge is 5 acres or less. For drainage areas greater than 5 acres use Permanent Diversion measure.
- Where the intended use is 1 year or less. For uses greater than 1 year use Permanent Diversion measure.

### 5.1.2.4 Storage - Temporary Sediment Traps

*Reference: Section 5-11-25 of the 2002 Guidelines*

Temporary Sediment Traps are temporary ponding areas with a stone or engineered outlet formed by excavation and/or construction of an earthen embankment. They are intended to detain sediment-laden run-off from small disturbed areas long enough to allow a majority of the sediment to settle out. If included in the project's erosion and sedimentation control plans, or required based on evolving site conditions, the sizing and location of Temporary Sediment Traps will be completed in conjunction with the project civil engineer.

#### Applicability-

- If the construction sequencing activities create an area of disturbance between two (2) acres and five (5) acres per each discharge point, the contractor must submit to the engineer a revised SWPCP for review and approval. The SWPCP must include locations of the temporary sedimentation trap installed prior to each discharge point with a capacity to contain 134 cubic yards per acre of material in accordance with the 2002 Guidelines. The contractor shall provide an inspection and maintenance plan for the temporary sedimentation trap as part of the amended SWPCP.
- Where the intended use is 2 years or less.
- When diverting sediment-laden water with temporary diversions that meet the above limitations for use.

#### Maintenance-

Inspect temporary sediment traps at least once a week and within 24 hours of the end of a storm with a rainfall amount of 0.5 inch or greater. Check the outlet to ensure that it is structurally sound and has not been damaged by erosion or construction equipment. The height of the stone outlet should be maintained at least 1 foot below the crest of the embankment. Also check for sediment accumulation and filtration performance. When sediments have accumulated to one half the minimum required volume of the wet storage, dewater the trap as needed, remove sediments and restore the trap to its original dimensions. Dispose of the sediment removed from the basin in a suitable area and in such a manner that it will not erode and cause sedimentation problems. The temporary sediment trap may be removed after the contributing drainage area is stabilized. If it is to be removed, refer to the project plans for how the site of the temporary sediment trap is to be graded and stabilized after removal.

## 5.2 Dewatering

*Reference: Form 816, Section 1.10, as amended*

Dewatering may be utilized at the site to lower the groundwater table to allow for the construction of subsurface improvements (utilities, foundations, etc.) within a relatively dry environment. Several dewatering techniques may be utilized at the contractor's discretion based on the specific nature of the work. These may include:

- Sumps
- Wells
- Wellpoints

Dewatering wastewaters shall be managed in accordance with the 2002 Guidelines. Where feasible and appropriate, dewatering wastewaters will be infiltrated into the ground. Dewatering wastewaters discharged to surface waters will be discharged in a manner that minimizes the discoloration of the receiving waters. No discharge of dewatering wastewater(s) shall contain or cause a visible oil sheen, floating solids, or foaming in the receiving water. Unless otherwise specifically approved in writing by DEEP, or if otherwise authorized by another state or federal permit, dewatering measures shall be installed on upland soils.

The following measures will be employed to ensure that dewatering wastewaters will not cause scouring or erosion or contain suspended solids in amounts that could reasonably be expected to cause pollution:

- Divert surface waters away from areas needing dewatering.
- Consider if well points and sumps can be used to lower the groundwater table, reducing the need for settling facilities.
- For sites that don't require continuous pumping, pump work areas before construction activities begin each work day.
- Provide filtration near the suction intake.
- Locate pumps, intake sumps, and other intake structures in areas which will not require constant moving, when possible.
- Locate pump discharge facilities (portable, permanent, or bio-filtering structures) such that a minimum disturbance of existing wetlands and watercourses is incurred.
- Provide protection at outlets from pumping operations to dissipate pumping surges and prevent erosion at the point of discharge.

### 5.2.1 Dewatering Plan

This SWPCP provides general measures for the management of dewatering wastewater based on the measures indicated in the 2002 Guidelines. It is recognized that the use of these measures is dependent upon specific site conditions, the contractor's specific method of operations, and the contractor's dewatering equipment. As this plan provides a general description of dewatering operations, the contractor will be required to submit a project-specific Dewatering Plan. This Dewatering Plan will be submitted to the engineer for review and approval prior to its implementation. The project-specific Dewatering Plan will, at a minimum, identify the following:

1. Locations and associated construction where dewatering is required.
2. Specific methods and devices proposed for dewatering.
3. Details on protection at the inlet and outlet of pumps, method for floating the pump intake, or other methods to minimize and retain the sediment.
4. Proposed location of dewatering discharge and details of infiltration basins or other discharge location. Per the General Permit, where feasible and appropriate, dewatering wastewaters will be infiltrated into the ground.
4. Details on any containment berm construction when dewatering earth materials.
5. Identification of a contingency plan for emergency operations should the dewatering operation prove inadequate to meet the dewatering need or is found to be causing unacceptable turbidity problems (e.g., alternative discharge locations or use of a portable sediment tank). If turbidity or siltation problems are not adequately controlled by the contingency plan, then the operation will be ceased and a revised dewatering plan submitted for approval prior to further implementation.

### **5.3 Post Construction Stormwater Management**

After construction, stormwater runoff is a concern because it may contain contaminants such as suspended solids, petroleum hydrocarbons, nutrients, heavy metals, and salts that may have adverse effects on water quality. The sources of the pollutants are generally associated with urban land use, including automobile exhaust, mechanical wear of vehicles, leaf litter, deicing salts and atmospheric deposition. The pollutants accumulate on the land surfaces and are washed off during storm events into the receiving waterways and wetlands. The objective of the stormwater management system designed for the proposed development is to mitigate, to the most thorough extent possible, suspended solids and floatables (i.e. oil and grease, other floatable liquids, floatable solids, trash, etc.) from stormwater.

Currently, there is no water quality treatment for this portion of Route 31. The existing drainage and outfall protection is inadequate and stormwater is discharged directly to resource areas via leak offs for a portion of the roadway. The proposed design provides a stormwater treatment train and addresses stormwater quality using the following methods:

- Four (4) foot sumps in proposed catch basins, unless prevented by utility or shallow ledge conflicts.
- Outlet protection (scour holes) at all outfalls

The existing characteristics of the work area for the reconstruction of route 31 consist of greater than 40% impervious cover. However, as part of the reconstruction project, the total effective impervious cover will not be increased. As a result, onsite retention of one half of the water quality volume is not required.

#### **5.3.1 Post Construction Controls:**

##### **5.3.1.1 Runoff Reduction and Low Impact Development (LID) Practices:**

Due to the limited physical space available throughout the work area, runoff reduction and LID practices to provide primary stormwater treatment of the main outlets would have required the filling of wetlands and were not pursued.

#### 5.3.1.2 Suspended Solids and Floatables Removal:

Per the 2000 ConnDOT Drainage Manual, ConnDOT considers the use of 10 or less primary deep sump catch basins to be suitable water quality treatment for a given watershed, and do not require any additional treatment. Four (4) foot sump catch basins shall be installed in all locations, barring any utility or ledge conflicts. All proposed roadway areas are designed to route to the catch basins instead of sheet flowing off site to sensitive areas.

#### 5.3.1.3 Velocity Dissipation

Unlike the existing condition, the proposed design will utilize the installation of outlet protection scour holes and riprap velocity attenuation pads engineered to accept the discharge velocities from the newly installed storm system. Details for these devices are included with the erosion control details in Attachment 2.

#### 5.3.2 Permanent Stabilization Practices

Permanent site stabilization practices are included on the drawings in Attachment 2 and include the following:

- **Hardscape** – The majority of the site is hardscape. Hardscape will include reconstructed bituminous pavement roadways, driveways, concrete sidewalks and walkways, and concrete stairs/ramps. Stormwater from these areas will either 1) run-off to an adjacent pervious surface (e.g. grass or landscaping), or 2) run-off to a collection point such as catch basin or area drain, and be conveyed to the roadway stormwater system.
- **Landscaping/Turf Establishment Areas** – After reconstruction of the roadway, several areas of the site will be landscaped and planted or replaced with permanent turf establishment. Landscape and turf areas will provide a stabilized surface, but will allow for direct infiltration of stormwater.

#### 5.3.3 Maintenance of Permanent Stabilization

After construction is completed and accepted by the State, inspection and maintenance of stabilized surfaces will be the responsibility of the State thereafter.

- **Landscape and Turf Areas:** Inspect semi-annually for erosion or dying vegetation. Repair and stabilize any bare or eroded areas and replace vegetation as soon as possible.
- **Hardscape:** Inspect on a regular basis not to exceed weekly for litter and debris. Sweep at least twice a year, with the first occurring as soon as possible after snowmelt and the second not less than 90 days following the first.
- **Catch Basin Sumps:** Inspect semi-annually and clean when the sump is one half full of silt and/or debris.

## **6.0 OTHER POLLUTION CONTROLS**

### **6.1 Waste Disposal**

6.1.1 Waste Materials - All waste materials generated at the site will be collected and stored in securely lidded, metal dumpsters rented from a licensed solid waste management company. All trash and construction debris from the site will be deposited in the dumpsters. When at capacity, the dumpsters will be removed from the site and transported to a state-licensed waste transfer or waste disposal facility. No construction waste materials will be burned, buried, or otherwise disposed-of on-site.

All personnel will be instructed regarding the correct procedure for waste disposal. Notices stating these practices will be posted in the office trailer and a competent person will be assigned day-to-day operation responsibilities.

6.1.2 Recycling – Waste materials generated at the site that are designated for recycling will be collected and stored in securely lidded, metal dumpsters rented from a licensed solid waste management company. Materials designated for recycling will be deposited in the appropriate dumpster based on material type. When at capacity, the dumpsters will be removed from the site and transported to a state-licensed transfer or recycling facility.

6.1.3 Liquid Waste Materials - The dumping of liquid wastes in storm sewers is prohibited. All liquid waste materials generated at the site will be collected and stored in secure containers suitable for the particular type of waste if such liquid waste is not suitable for the "Washout Area" (see below). Containers storing liquid waste will be removed from the site for disposal by a state-licensed company.

6.1.4 Hazardous Materials - All waste materials that are considered "hazardous" such as oils, greases, oil-based paints, solvents, etc. generated by construction will be stored and disposed of in accordance with local, state, and federal regulations. Site personnel must be instructed in the practices of handling, collecting and storage of hazardous materials, and a competent person will be assigned responsibility for seeing that these practices are followed.

6.1.5 Sanitary Waste - All sanitary waste will be collected from portable units on a regular basis as required by applicable regulations.

### **6.2 Washout Areas**

A designated "Washout Area" will be established for the purpose of washing the following:

- Latex paint equipment
- Vehicles, containers, and equipment for concrete
- Applicators and containers for materials which have not contained any oils, greases, oil-based paints, solvents, fuels, lubricants, etc.

The Washout Area shall be established as follows:

- (1) Outside of any buffers and at least 50 feet from any stream, wetland or other sensitive resource; or
- (2) In an entirely self-contained washout system.

The Washout Area shall be clearly delineated with fencing, flagging, or similar highly-visible materials. Washout activities are only permitted within the Washout Area. All wash water shall be directed into a container or pit designed such that no overflows can occur during rainfall or after snowmelt. There shall be no surface discharge of washout wastewaters from the Washout Area.

Hardened concrete waste from the Washout Area will be removed and disposed-of consistent with practices developed for the "Waste Materials" above. At least once per week, any containers or pits used for washout will be inspected to ensure structural integrity, adequate holding capacity, and to check for leaks or overflows. If there are signs of leaks, holes or overflows in the containers or pits that could lead to a discharge, the containers will be repaired prior to further use. For concrete washout areas, all hardened concrete waste will be removed whenever the hardened concrete has accumulated to a height of one-half (½) of the container or pit or as necessary to avoid overflows. A record of maintenance and inspections for the Washout Area is included in Appendix C.

### **6.3 Off-Site Vehicle Tracking**

*Reference: Section 5-12 of the 2002 Guidelines*

Stabilized construction entrances (ant-tracking pad) will be used to help reduce the movement of sediments from the site to off-site areas by vehicles. Construction details for these facilities are contained on the project's Erosion and Sedimentation Control Plans. A stabilized construction entrance will be installed at each primary site access point used by construction equipment.

Stabilized construction entrances will be maintained in a condition which will prevent tracking and washing of sediment onto paved surfaces. Each entrance will be periodically top-dressed with additional stone and/or additional length added as conditions demand.

All sediment spilled, dropped, washed or tracked onto paved surfaces will be immediately removed. Roads adjacent to the site will be left clean at the end of each day. It is also recognized that the use of stabilized construction entrances may not eliminate the need for periodic street sweeping. Therefore, adjacent paved roadways will be swept as necessary.

If the construction entrance is being properly maintained and the action of a vehicle traveling over the stone pad is not sufficient to remove the majority of the sediment, then either (1) the construction entrance will be lengthened, (2) the construction access road surface will be modified, or (3) washing racks (or similar devices) will be installed before the vehicle enters a paved surface. If a washing rack or similar device is to be used to wash sediment from tires, provisions will be employed to intercept the wash water and trap the sediment before it is carried off-site. Per the 2002 Guidelines, the sediment trapping facility will be sized to hold the maximum volume of water that would be used over a 2-hour period.

## **6.4 Dust Control**

The generation of fugitive dust will be minimized during all aspects of the work, and measures to suppress fugitive dust will be employed when work activities are conducted which could generate dust. Construction sequencing will be organized and conducted to the extent possible to leave existing pavement or ground coverings in place until just prior to earth excavation for the purpose of minimizing the migration of dust beyond the project limits into the surrounding area. If the amount of fugitive dust and/or particulate generated during the work is deemed unacceptable or exceeds baseline project site conditions the work will be halted and corrective measures implemented. Dust control and suppression will be implemented as follows:

### **6.4.1 Water**

Water will be applied only at the locations, at such times, and in the amount required to control and suppress dust. The volume of water sprayed for controlling dust shall be minimized so as to prevent the runoff of water. No discharge of dust control water shall contain or cause a visible oil sheen, floating solids, visible discoloration, or foaming in the receiving stream.

### **6.4.2 Calcium Chloride**

Calcium chloride will be applied only at the locations, times, and in the amount approved by the owner (as Permittee). The application of calcium chloride will be by means of a mechanical spreader, or other approved methods.

### **6.4.3 Mulch**

The use of mulch for dust control will be coordinated with erosion and sedimentation control measures. Straw mulch will be applied at a rate of 100 pounds per 1,000 square feet (100 lb/1,000 ft<sup>2</sup>). Wood chips or wood mulch will be applied at such a rate as to form a layer one (1) inch thick.

## **6.5 Spill Prevention**

### **6.5.1 Potential Stormwater Pollution Sources**

During construction, the following are potential sources of pollutants that could impact stormwater:

- Cleared and disturbed grassed/planted areas;
- Pavement and utility removal;
- Construction site entrances and bituminous access drive lot construction;
- Foundation excavation and building construction.
- Topsoil and mulch installation;
- Dewatering operations;
- Final grading and landscaping.

### 6.5.2 Good Housekeeping

The following good housekeeping practices will be followed on-site during the project:

- An effort will be made to store only enough products required to perform the work.
- All materials stored on-site will be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure.
- Products will be kept in their original containers with the original manufacturer's label.
- Substances will not be mixed with one another unless recommended by the manufacturer.
- Whenever possible, all of a product will be used up before disposing of the container and opening a new container.
- Manufacturers' recommendations for proper use and disposal will be followed.
- The Construction Manager and/or site superintendent will inspect daily to ensure proper use and disposal of materials on-site.
- Dumpsters will be kept covered and drain plugs will remain in place unless being cleaned.
- Products will be kept in original containers unless they are not re-sealable. Leftover product will be properly disposed of or placed in a sealable container.
- Original labels and material safety data will be retained as they contain important product information.
- If surplus product must be disposed of, manufacturers' or local and State recommended methods for proper disposal will be followed.

### 6.5.3 Product Specific Practices

The following product specific practices will be followed on-site:

- Chemical and Petroleum Product Storage - All chemical and petroleum product containers stored on the site (excluding those contained within vehicles and equipment) will be stored in tightly sealed containers that are clearly labeled. All chemical and petroleum product containers will be provided with impermeable containment which will hold at least 110% of the volume of the largest container, or 10% of the total volume of all containers in the area, whichever is larger, without overflow from the containment area. All chemicals and their containers will be stored under a roofed area except for those chemicals stored in containers of 100 gallon capacity or more, in which case a roof is not required. Double-walled tanks satisfy this requirement.
- Petroleum Products - All on-site construction vehicles will be monitored for leaks and receive regular preventive maintenance to reduce the chance of leakage. Any asphalt substances used on-site will be applied according to the manufacturer's recommendations. Spill kits will be included with any fueling sources and maintenance activities.

- Fertilizers - Fertilizers used will be applied only in the minimum amounts recommended by the manufacturer. Once applied, fertilizer will be worked into the soil to limit exposure to stormwater. Fertilizer will not be stored on site.
- Paints - All containers will be tightly sealed and stored when not required for use. Excess paint will not be discharged to the storm sewer system, but will be properly disposed of according to manufacturers' instructions or State and local regulations. Spray guns will be cleaned on a removable tarp.

#### 6.5.4 Spill Control Practices

In addition to the good housekeeping and material management practices discussed in the previous sections of this plan, the following practices will be followed for spill prevention and cleanup:

- Manufacturer's recommended methods for spill cleanup will be clearly posted and site personnel will be made aware of the procedures and the location of the information.
- Materials and equipment necessary for spill cleanup will be kept in the designated material storage areas on-site. Equipment and materials will include, but not be limited to, brooms, dustpans, mops, rags, gloves, goggles, kitty litter, sand, sawdust, Speedi-Dry and plastic and metal trash containers specifically made for this purpose.
- All spills will be cleaned up immediately after discovery.
- The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance.
- Spills of toxic or hazardous materials will be reported to the appropriate State and/or local government agency, regardless of the size. The National Response Center number is 800-424-8802. The CT DEEP Emergency Reporting number is 800-424-3333.
- The site construction superintendent will be responsible for the day-to-day operations, and act as the person responsible for spill prevention and cleanup. The names of responsible construction spill containment and cleanup personnel will be posted in the material storage area and in the office trailer on-site.

#### 6.6 Post-Construction Cleaning

All post-construction stormwater structures will be cleaned of construction sediment and any remaining silt fence shall be removed upon stabilization of the site, prior to filing notice of termination.

## 7.0 INSPECTION AND MONITORING

Throughout all phases of construction, the erosion control measures will be routinely inspected, cleaned, repaired, and replaced as necessary. Maintenance of erosion and sedimentation control measures is critical to their effectiveness. Maintenance will be an ongoing process during the period of construction and will continue until long-term vegetation is established. Mulching and seeding will be inspected throughout all phases of construction: at the end of each workday, if precipitation is forecast and after each rainfall. At the end of each workweek, prior to weekends, all erosion and sediment control measures will be inspected and repairs/replacements made as required.

Throughout the construction process, extra stocks of hay bales and filter fabric will be kept on-site to replace those that may become damaged and/or deteriorated.

Any erosion and sediment control measures, which upon inspection, are found to be damaged, deteriorated, or not functioning properly, will be repaired, replaced and corrected immediately after inspection.

Inspection procedures will be addressed and implemented in the following manner:

### 7.1 Plan Implementation Inspections

Within the first 30 days following commencement of construction activity on the site, a representative of the Permittee will inspect the site. The Permittee's representative for Plan Implementation Inspections is:

ConnDOT District 1 Construction Office  
1107 Cromwell Avenue  
Rocky Hill, CT 06067

The Permittee's representative will inspect the site at least once and no more than three times during the first 90 days of commencement of the construction activity to confirm compliance with the General Permit and proper initial implementation of all control measures designated in this SWPCP for the site for the initial phase of construction.

### 7.2 Routine Inspections

The Permittee will routinely inspect the site for compliance with the General Permit and this SWPCP for the site until a Notice of Termination has been submitted. Inspection procedures for these Routine Inspections will be addressed and implemented in the following manner.

#### 7.2.1 Qualified Inspector

The Permittee will retain a Qualified Inspector meeting the following definition:

*"an individual possessing either (1) a professional license or certification by a professional organization recognized by the commissioner related to agronomy, civil engineering, landscape architecture, soil science, and two years of demonstrable and focused experience in erosion and sediment control plan reading, installation, inspection and/or report writing for residential and commercial construction projects in accordance with the Guidelines; or (2) five years of demonstrable and focused experience in erosion and sediment control plan reading, installation, inspection and/or report writing for residential and*

*commercial construction projects in accordance with the Guidelines; or (3) certification by the Connecticut Department of Transportation (DOT)".*

The Permittee's Qualified Inspector will be an individual(s) from:

ConnDOT District 1 Construction Office  
1107 Cromwell Avenue  
Rocky Hill, CT 06067

#### 7.2.2 Rainfall Measurement

The Permittee will maintain a rain gauge on-site to document rainfall amounts.

#### 7.2.3 Inspection Criteria

At least once a week and within 24 hours of the end of a storm that generates a discharge, the Qualified Inspector, will inspect, at a minimum, the following:

- Disturbed areas of the construction activity that have not been finally stabilized.
- All erosion and sedimentation control measures.
- All structural control measures.
- Soil stockpile areas.
- Washout Areas.
- Locations where vehicles enter or exit the site.

For storms that end on a weekend, holiday or other time after which normal working hours will not commence within 24 hours, an inspection is required within 24 hours only for storms that equal or exceed 0.5 inches. For storms of less than 0.5 inches, an inspection will occur immediately upon the start of the subsequent normal working hours. Where sites have been temporarily or finally stabilized, inspections will be conducted at least once every month for three months.

The areas noted above will be inspected for evidence of, or the potential for, pollutants entering the drainage system and impacts to the receiving waters. Locations where vehicles enter or exit the site will also be inspected for evidence of off-site sediment tracking. Where sites have been temporarily or finally stabilized, such inspection will be conducted at least once every month for three months.

The Qualified Inspector will evaluate the effectiveness of erosion and sediment controls, structural controls, stabilization practices, and any other controls implemented to prevent pollution and determine if it is necessary to install, maintain, or repair such controls and/or practices to improve the quality of stormwater discharge(s).

#### 7.2.4 Inspection Report

Following each inspection, the Qualified Inspector will prepare a report that will summarize the following:

- The scope of the inspection.
- Name(s) and qualifications of personnel making the inspection.
- The date(s) of the inspection.
- Weather conditions including precipitation information.
- Major observations relating to erosion and sediment controls and the implementation of the SWPCP.
- A description of the stormwater discharge(s) from the site.
- Any water quality monitoring performed during the inspection.

Report forms are included in Appendix A. The report will be signed by the Permittee or his authorized representative. Reports will be retained as part of the SWPCP.

The report will include a statement that, in the judgment of the Qualified Inspector(s) conducting the Routine Inspection, the site is either in compliance or out of compliance with the terms and conditions of this SWPCP and General Permit. If the site inspection indicates that the site is out of compliance, the inspection report will include a summary of the remedial actions required to bring the site back into compliance. Non-engineered corrective actions (as identified in the 2002 Guidelines) will be implemented on site within 24 hours and incorporated into a revised SWPCP within three (3) calendar days of the date of inspection unless another schedule is specified in the 2002 Guidelines. Engineered corrective actions (as identified in the 2002 Guidelines) shall be implemented on site within seven (7) days and incorporated into a revised SWPCP within ten (10) days of the date of inspection, unless another schedule is specified in the 2002 Guidelines or is approved by DEEP. During the period in which any corrective actions are being developed and have not yet been fully implemented, interim measures will be implemented to minimize the potential for the discharge of pollutants from the site.

Inspectors from DEEP may inspect the site for compliance with the General Permit at any time construction activities are ongoing and upon completion of construction activities to verify the final stabilization of the site and/or the installation of post-construction stormwater management measures.

#### 7.2.5 Turbidity Monitoring

The Permittee via the Qualified Inspector, will perform turbidity monitoring at each of the 3 "Main Outlet" locations indicated on the registration and in accordance with the following:

##### Monitoring Frequency

- Sampling will be conducted at least once every month, when there is a discharge of stormwater from the site while construction activity is ongoing, until final stabilization of the drainage area associated with each outfall is achieved.

- The Permittee will collect samples during normal working hours, which for this project are Monday through Friday, between the hours of 8:00 am and 5:00 pm.
- If sampling is discontinued due to the end of normal working hours, the Permittee will resume sampling the following morning or the morning of the next working day following a weekend or holiday, as long as the discharge continues.
- Sampling may be temporarily suspended any time conditions exist that may reasonably pose a threat to the safety of the person taking the sample. Such conditions may include high winds, lightning, impinging wave or tidal activity, intense rainfall or other hazardous condition. Once the unsafe condition is no longer present, sampling will resume.
- If there is no stormwater discharge during a month, sampling will not be conducted.

#### Sample Collection

- All samples will be collected from discharges resulting from a storm event that occurs at least 24 hours after any previous storm event generating a stormwater discharge.
- Any sample containing snow or ice melt must be identified on the Stormwater Monitoring Report form. Sampling of snow or ice melt in the absence of a storm event is not a valid sample.
- Samples shall be grab samples taken at least three separate times during a storm event and shall be representative of the flow and characteristics of the discharge(s). Samples may be taken manually or by an in-situ turbidity probe or other automatic sampling device equipped to take individual turbidity readings (i.e. not composite). The first sample shall be taken within the first hour of stormwater discharge from the site. In cases where samples are collected manually and the discharge begins outside of normal working hours, the first sample shall be taken at the start of normal working hours.

#### Sampling Locations

- Sampling is required of all point source discharges of stormwater from disturbed areas.
- Where there are two or more discharge points that discharge substantially identical runoff, based on similarities of the exposed soils, slope, and type of stormwater controls used, a sample may be taken from just one of the discharge points. In such case, the Permittee will report that the results also apply to the substantially identical discharge point(s).
- No more than 5 substantially identical outfalls may be identified for one representative discharge. If such project is planned to continue for more than one year, the Permittee shall rotate twice per year the location where samples are taken so that a different discharge point is sampled every six months.
- The outfalls authorized by the General Permit are identified on the Erosion and Sedimentation Control Plans.

#### Sampling and Analysis

Sampling and turbidity analysis will be conducted in accordance with ASTM D6855. Results will be reported in Nephelometric Turbidity Units (NTU).

#### Turbidity Values

The stormwater discharge turbidity value for each sampling point will be determined by taking the average of the turbidity values of all samples taken at that sampling point during a given storm.

#### 7.2.6 Stormwater Monitoring Reports

Within thirty (30) days following the end of each month, the Permittee will submit the stormwater sampling result(s) on the Stormwater Monitoring Report (SMR) form included in Appendix B. If there was no discharge during any given monitoring period, the Permittee will submit the form as required with the words "no discharge" entered in place of the monitoring results. If the Permittee monitors any discharge more frequently than required by the General Permit, the results of this monitoring will be included in additional SMRs for the month in which the samples were collected.

## 8.0 CERTIFICATION

The following Certification Statement applies to this SWPCP. All project participants who are involved with "site" construction (e.g. Construction Manager, General Contractor, Contractor, Subcontractors, etc.) are required to certify to this plan by signing in the space provided. By signing, each project participant certifies the following:

**"I certify under penalty of the law that I have read and understand the terms and conditions of the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities. I understand that as a contractor or subcontractor at the site, I am authorized by this general permit, and must comply with the terms and conditions of this general permit, including, but not limited to, the requirements of the Stormwater Pollution Control Plan prepared for the site."**

1	<div>Signature _____</div> <div>Printed Name _____</div> <div>Date _____</div>	<div>On behalf of (company):</div> <div>Telephone Number:</div> <div>Responsible for (project role):</div>
2	<div>Signature _____</div> <div>Printed Name _____</div> <div>Date _____</div>	<div>On behalf of (company):</div> <div>Telephone Number:</div> <div>Responsible for (project role):</div>
3	<div>Signature _____</div> <div>Printed Name _____</div> <div>Date _____</div>	<div>On behalf of (company):</div> <div>Telephone Number:</div> <div>Responsible for (project role):</div>

4	<p>Signature _____</p> <p>Printed Name _____</p> <p>Date _____</p>	<p>On behalf of (company):</p> <p>Telephone Number: _____</p> <p>Responsible for (project role): _____</p>
5	<p>Signature _____</p> <p>Printed Name _____</p> <p>Date _____</p>	<p>On behalf of (company):</p> <p>Telephone Number: _____</p> <p>Responsible for (project role): _____</p>
6	<p>Signature _____</p> <p>Printed Name _____</p> <p>Date _____</p>	<p>On behalf of (company):</p> <p>Telephone Number: _____</p> <p>Responsible for (project role): _____</p>
7	<p>Signature _____</p> <p>Printed Name _____</p> <p>Date _____</p>	<p>On behalf of (company):</p> <p>Telephone Number: _____</p> <p>Responsible for (project role): _____</p>
8	<p>Signature _____</p> <p>Printed Name _____</p> <p>Date _____</p>	<p>On behalf of (company):</p> <p>Telephone Number: _____</p> <p>Responsible for (project role): _____</p>

**APPENDIX A**  
**Stormwater Monitoring Reports**



Connecticut Department of  
Energy & Environmental Protection  
Bureau of Materials Management & Compliance Assurance  
Water Permitting & Enforcement Division

General Permit for the Discharge of Stormwater and Dewatering Wastewaters from  
Construction Activities, issued 8/21/13, effective 10/1/13  
Stormwater Monitoring Report

SITE INFORMATION

Permittee:	_____
Mailing Address:	_____
Business Phone:	_____ ext.: _____ Fax: _____
Contact Person:	_____ Title: _____
Site Name:	_____
Site Address:	_____
Receiving Water (name, basin):	_____
Stormwater Permit No.	GSN _____

SAMPLING INFORMATION (Submit a separate form for each outfall)

Outfall Designation:	_____	Date/Time Collected:	_____
Outfall Location(s) (lat/lon or map link):	_____		
Person Collecting Sample:	_____		
Storm Magnitude (inches):	_____	Storm Duration (hours):	_____
Size of Disturbed Area at any time:	_____		

MONITORING RESULTS

Sample #	Parameter	Method	Results (units)	Laboratory (if applicable)
1	Turbidity			
2	Turbidity			
3	Turbidity			
4	Turbidity			
(provide an attachment if more than 4 samples were taken for this outfall)			Avg = _____	

STATEMENT OF ACKNOWLEDGMENT

I certify that the data reported on this document were prepared under my direction or supervision in accordance with the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities. The information submitted is, to the best of my knowledge and belief, true, accurate and complete.

Authorized Official:	_____
Signature:	_____ Date: _____

Please send completed form to:

DEPARTMENT OF ENERGY & ENVIRONMENTAL PROTECTION  
BUREAU OF MATERIALS MANAGEMENT AND COMPLIANCE ASSURANCE  
79 ELM STREET  
HARTFORD, CT 06106-5127  
ATTN: NEAL WILLIAMS

**APPENDIX B**  
**Velocity Dissipation Calculations for Outlet Control Sizing**

FINAL DESIGN DRAINAGE REPORT  
RECONSTRUCTION OF ROUTE 31  
COVENTRY, CT  
STATE PROJECT NO. 32-130

Appendix G  
Outlet Protection Worksheets

## Appendix A – Outlet Protection Form

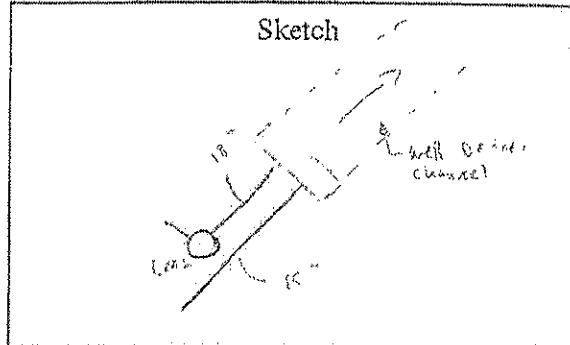
## OUTLET PROTECTION

Project No.: 32-130 Designed By: WGW Date: 7/16/08  
 Town: Coventry Checked By: JLF Date: 7/16/08  
 Route: 31 Station: STA 17+62 – 27.8 LT

## 1. Assess the erosion potential at the outlet and other critical site factors

Describe the conditions at the outlet location:  
Outlet will consist of (1) endwall with (2)  
pipes (1-15" brook crossing, 1-18" roadway  
system with the same invert). A level scour  
hole will be constructed just upstream of the  
existing well-defined channel.

- ☐ No well-defined channel  
☒ Well-defined channel



## 2. Determine the tailwater (TW) conditions at the outlet

TW depth: 1.40 ft TW elevation: 495.00  
 TW computational method: HGL at roadway system outlet (Bernoulli's Equation)  
 Channel bed elevation: 493.60 Estimated velocity in channel: 7.06 fps

## 3. Calculate and evaluate the outlet velocity for the design discharge

Design Discharge: 11.34 cfs (combined) Design Frequency: 25-Year  
 Outlet Pipe Size: (1)-15", (1)-18" Type: RCP  
 Length: 9' (18"), 66' (15") Slope: 1.10% (18"), 2.90% (15") Outlet Invert Elevation: 493.60  
 Outlet Velocity at design discharge: 7.06 fps (18"), 6.46 fps (15")  
 Velocity computational method: Bernoulli's Equation

## 4. Select the type of outlet protection

- ☐ Riprap Apron  
 (See Figures 11-13 & 11-14)

Type \_\_\_\_\_ (A,B,C)

Riprap type: \_\_\_\_\_  
 Length ( $L_a$ ): \_\_\_\_\_  
 Width ( $W_1$ ): \_\_\_\_\_  
 Width ( $W_2$ ): \_\_\_\_\_  
 Width-Type C ( $W_3$ ): \_\_\_\_\_

- ☒ Preformed Scour Hole  
 (See Figure 11-15)

	Type 1	Type 2
$d_{50}$	<u>0.20 ft</u>	_____
F	<u>0.75 ft</u>	_____
C	<u>12.75 ft</u>	_____
B	<u>10.00 ft</u>	_____
$S_p$	<u>2.75 ft</u>	_____

Proposed Type: 1  
 Riprap Type: Modified

FINAL HYDRAULIC DESIGN REPORT  
RECONSTRUCTION OF ROUTE 31  
COVENTRY, CT  
STATE PROJECT NO. 32-130

Appendix E  
Outlet and Inlet Protection Computations

## Calculation Sheet



Project No. 83160.00  
Subject Route 31 Reconstruction  
Location Coventry, CT

Calc By B. Sherman  
Date 2/25/2008  
Revised 1/14/2009  
Checked by \_\_\_\_\_  
Date \_\_\_\_\_

### NORTH TRIBUTARY (STA 00+50)

CULVERT 2-48 "Ø	Q50 = 137 CFS	Q100 = 164 CFS
	V50 (UP) = 8.29 FPS	V100 (UP) = 8.93 FPS
	V50 (DN) = 5.45 FPS	V100 (DN) = 6.53 FPS

(STA 00+13) TW (DW 50) = 4.41' TW (DN 100) = 5.18'

USE Q100 & V100 FOR PURPOSES OF DESIGN

QD = 164 CFS VD = 6.53 FPS TWD = 5.18'

# Calculation Sheet



Project No. 83160.00  
 Subject Route 31 Reconstruction  
 Location Coventry, CT

Calc By B. Sherman  
 Date 2/25/2008  
 Revised 12/29/2008  
 Checked by  
 Date

## PREFORMED SCOUR HOLE TYPE 1 FROM CONNECTICUT DOT DRAINAGE MANUAL (MAY 2002)

Tributary North Discharge Sta. 00+50

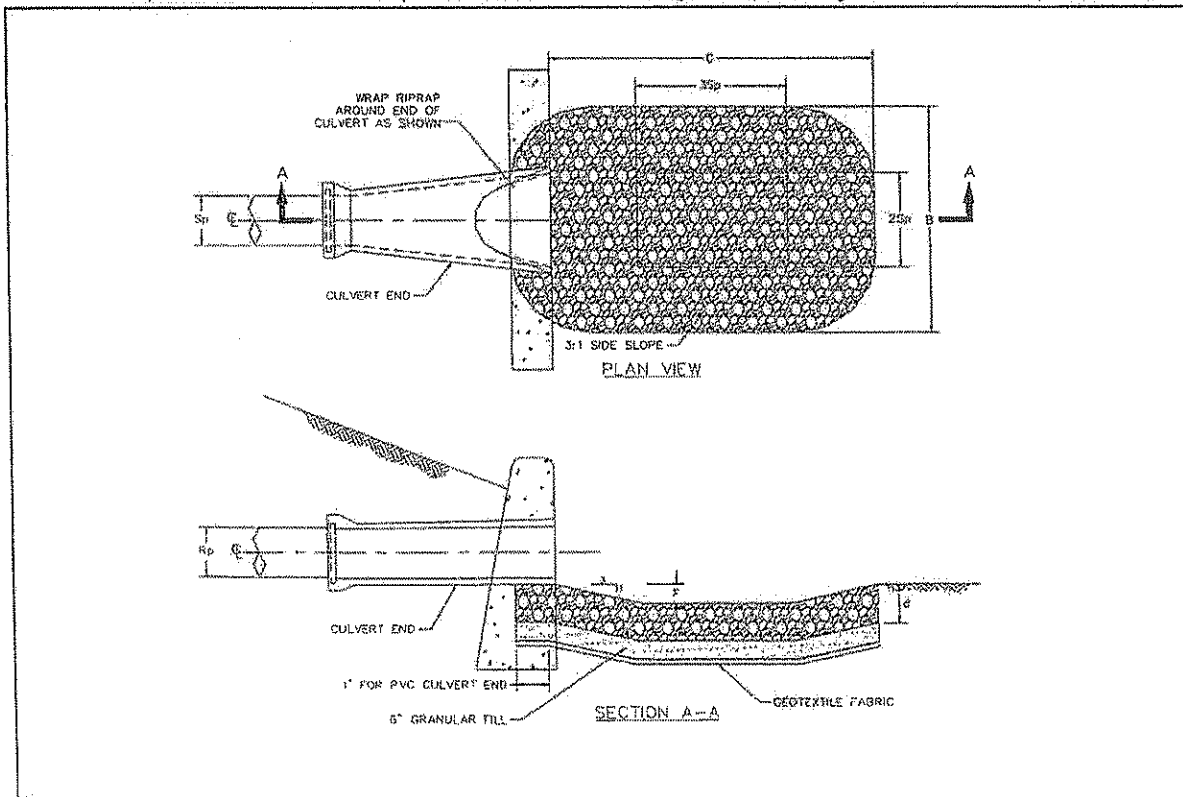
GIVEN:  $R_p = 4.00$  maximum inside pipe rise, ft  
 $S_p = 10.00$  inside dia. of circular sections or max. inside pipe span for non-circular sections (ft)  
 value is based on the sum of both culverts (4'+4'+2' separation)  
 $Q = 164.00$  cfs (use Qfull at 100-year design event)  
 $T_w = 5.18$  ft (at 100 year event)

FIND:  $D_{50} = \text{Average Rock Diameter Required}$   
 $D_{50} = ((0.0125 * R_p^2) / T_w) * (Q / (R_p^{2.5}))^{(1.333)} = 0.4 \text{ feet}$   
 $4.8 \text{ inches}$   
 Use:  $6 \text{ inches}$   
 $F = 0.5 R_p = \text{Basin Depression} = 2 \text{ feet}$   
 $C = 3S_p + 6F = \text{Basin Length} = 42.00 \text{ feet}$   
 $B = 2S_p + 6F = \text{Basin Inlet and Outlet Width} = 32.00 \text{ feet}$

The type of riprap is as follows:

Modified	$d_{50} < 0.13 \text{ m (0.42 ft)}$
Intermediate	$0.13 \text{ m (0.42 ft)} < d_{50} < 0.20 \text{ m (0.67 ft)}$
Standard	$0.20 \text{ m (0.67 ft)} < d_{50} < 0.38 \text{ m (1.25 ft)}$
Special Design	$0.38 \text{ m (1.25 ft)} < d_{50}$

Reference: Report No. FHWA-RD-75-508 ("culvert Outlet Protection Design: computer Program Documentation")



## Calculation Sheet



Project No. 83160.00  
Subject Route 31 Reconstruction  
Location Coventry, CT

Calc By B. Sherman  
Date 2/25/2008  
Revised 1/14/2009  
Checked by \_\_\_\_\_  
Date \_\_\_\_\_

MILL BROOK WEST (STA 29+47)

EXIST CULVERT 9' W X 1.5' H

Q25 = 75 CFS  
V25 (UP) = 5.56 FPS  
V25 (DN) = 12.88 FPS

Q100 = 79 CFS  
V100 (UP) = 5.85 FPS  
V100 (DN) = 5.85 FPS

(STA 28+12) TW 25 = 0.65'

TW 100 = 2.96'

USE Q25 & V25 FOR PURPOSES OF DESIGN

QD = 75 CFS VD = 12.88 FPS TWD = 0.65'

# Calculation Sheet



Project No. 83160.00  
 Subject Route 31 Reconstruction  
 Location Coventry, CT

Calc By B. Sherman  
 Date 2/25/2008  
 Checked by  
 Date

## PREFORMED SCOUR HOLE TYPE 1 FROM CONNECTICUT DOT DRAINAGE MANUAL (MAY 2002)

Mill Brook West Discharge Sta. 29+47

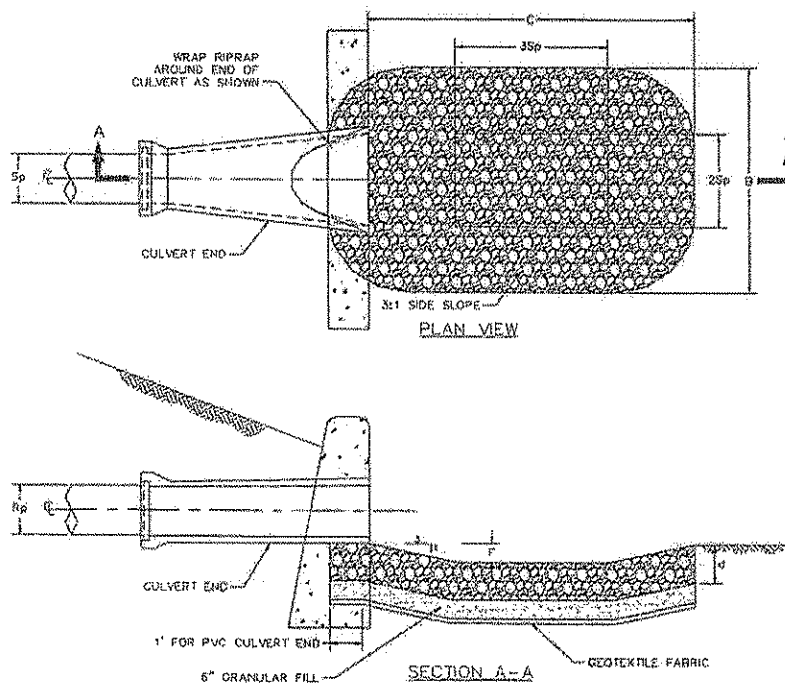
GIVEN:  $R_p = 1.50$  maximum inside pipe rise, ft  
 $S_p = 9.00$  inside dia. of circular sections or max. inside pipe span for non-circular sections (ft)  
 $Q = 75.00$  cfs (use Qfull at 25-year design event)  
 $T_w = 0.65$  ft (at 25 year event)

FIND:  $D_{50}$  = Average Rock Diameter Required  
 $D_{50} = ((0.0125 \cdot R_p^2) / T_w) \cdot (Q / (R_p^{2.5}))^{1.333} = 3.6$  feet  
 $43.2$  inches  
 Use:  $48$  inches  
 $F = 0.5 R_p = 0.75$  feet  
 $C = 3S_p + 6F = 31.50$  feet  
 $B = 2S_p + 6F = 22.50$  feet  
 Basin Depression =  
 Basin Length =  
 Basin Inlet and Outlet Width =

The type of riprap is as follows:

Modified	$d_{50} < 0.13$ m (0.42 ft)
Intermediate	$0.13$ m (0.42 ft) $< d_{50} < 0.20$ m (0.67 ft)
Standard	$0.20$ m (0.67 ft) $< d_{50} < 0.38$ m (1.25 ft)
Special Design	$0.38$ m (1.25 ft) $< d_{50}$

Reference: Report No. FHWA-RD-75-508 ("culvert Outlet Protection Design: computer Program Documentation")



# Calculation Sheet



Project No. 83160.00  
 Subject Route 31 Reconstruction  
 Location Coventry, CT

Calc By B. Sherman  
 Date 2/25/2008  
 Checked by  
 Date

## PREFORMED SCOUR HOLE TYPE 2 FROM CONNECTICUT DOT DRAINAGE MANUAL (MAY 2002)

Mill Brook West Discharge Sta. 29+47

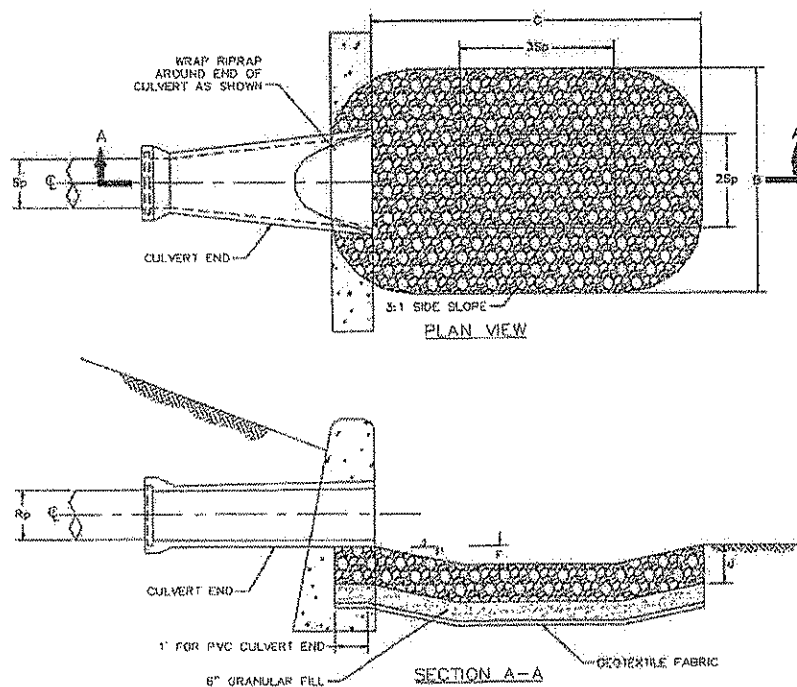
GIVEN:  $R_p = 1.50$  maximum inside pipe rise, ft  
 $S_p = 9.00$  inside dia. of circular sections or max. inside pipe span for non-circular sections (ft)  
 $Q = 75.00$  cfs (use Qfull at 25-year design event)  
 $T_w = 0.65$  ft (at 25 year event)

FIND:  $D_{50}$  = Average Rock Diameter Required  
 $D_{50} = ((0.0082 \cdot R_p^2) / T_w) \cdot (Q / (R_p^{2.5}))^{1.333} = 2.4$  feet  
 $28.8$  inches  
 Use:  $30$  inches  
 $F = R_p = 1.50$  feet  
 $C = 3S_p + 6F = 36.00$  feet  
 $B = 2S_p + 6F = 27.00$  feet  
 Basin Depression =  
 Basin Length =  
 Basin Inlet and Outlet Width =

The type of riprap is as follows:

Modified	$d_{50} < 0.13$ m (0.42 ft)
Intermediate	$0.13$ m (0.42 ft) $< d_{50} < 0.20$ m (0.67 ft)
Standard	$0.20$ m (0.67 ft) $< d_{50} < 0.38$ m (1.25 ft)
Special Design	$0.38$ m (1.25 ft) $< d_{50}$

Reference: Report No. FHWA-RD-75-508 ("culvert Outlet Protection Design: computer Program Documentation")



# Calculation Sheet



Project No. 83160.00  
 Subject COVENTRY SCOUR  
DETERMINATION  
 Location Coventry, CT

Calc By B. Sherman  
 Date 2/25/2008

Checked by \_\_\_\_\_  
 Date \_\_\_\_\_

## ALTERNATIVE DETERMINATION OF D50 FOR MILL BROOK WEST CULVERT

-MANNINGS 'n'

DAVG = 3.86 FT D50 = 0.25 FT  $\therefore \text{DAVG/D50} = 3.86/0.25$   
 $= 15.44 < 185$   
 USE EQ (2)

BUT HIGH GRADIENT STREAMS USE EQUATION (4)

EQ (4):  $n = 0.39 \text{ SF}^{0.38} \text{ R}^{-0.16}$

WHERE SF = FRICTION SLOPE, FROM HEC RAS = 2.88%  
 R = HYDRAULIC RADIUS =  $\frac{\text{FLOW AREA}}{\text{WETTED PERIMETER}}$

$$= \frac{(9' \times 0.65')}{(9 + 0.65 + 0.65)} = 0.57$$

$$n = 0.39 (0.0288)^{0.38} (0.57)^{-0.16}$$

$$n = 0.11$$

-DETERMINE DESIGN WATER SURFACE @ STA. 28+12

WSE (28+12) = 450.95

AVG DEPTH = 3.86' V = 12.88 FPS

CHART 4 (PG 129) = VERY ANGULAR d50= 0.5 FT  $\theta = 42^\circ$   
 CHART 3 (PG 128) = 1.5:1  $\theta = 42^\circ$   $K_1 = 0.55$

$$\therefore \text{D50} = 0.001 \text{ Va}^3 / \text{davg}^{0.5} \text{ K}_1^{1.5}$$

$$= \frac{0.001 (12.88 \text{ FPS})^3}{(3.86)^{0.5} (0.55)^{1.5}} = \frac{2.136}{(1.96) (0.41)} = 2.65 \text{ FT}$$

D50 = 2.65 FT or 31.92"

USE 36" = D50

# Calculation Sheet



Project No. 83160.00  
Subject COVENTRY HYDRAULICS  
Location Coventry, CT

Calc By B. Sherman  
Date 2/21/2008  
Checked by \_\_\_\_\_  
Date \_\_\_\_\_

## MILL BROOK EAST CULVERTS KNOWN INFORMATION:

### LOW FLOW CULVERT -

US INVERT = 447.00  
DS INVERT = 444.00  
LENGTH = 124'  
SLOPE = 2.42%

Q25 = 101.53 CFS  
V25 (UP) = 9.35 FPS  
V25 (DN) = 9.57 FPS  
TW 25 (DN) = 2.61 FT

Q100 = 129.70 CFS  
V100 (UP) = 10.14 FPS  
V100 (DN) = 10.42 FPS  
TW 25 (DN) = 2.97 FT

### HIGH FLOW CULVERT -

US INVERT = 448.0  
DS INVERT = 445.0  
LEN = 124'  
SLOPE = 2.42%

Q25 = 86.47 CFS  
V25 (UP) = 8.23 FPS  
V25 (DN) = 14.15 FPS  
TW25 (DN) = 2.61 FT

Q100 = 117.30 CFS  
V100 (UP) = 7.82 CFS  
V100 (DN) = 15.72 CFS  
TW100 (DN) = 2.97 FT.

\* VALUES OBTAINED FROM HEC-RAS

QT25 = 188 CFS  
QT100 = 247 CFS

BASED ON FLOWS AND VELOCITIES AT THE DISCHARGE LOCATION, THE TYPE 1  
PERFORMED SCOUR HOLES ARE PROPOSED FOR THIS LOCATION. (SEE ATTACHED  
CALCULATIONS)

# Calculation Sheet



Project No. 83160.00  
 Subject Route 31 Reconstruction  
 Location Coventry, CT

Calc By B. Sherman  
 Date 2/21/2008  
 Revised 3/26/2009  
 Checked by  
 Date

## PREFORMED SCOUR HOLE TYPE 1 FROM CONNECTICUT DOT DRAINAGE MANUAL (MAY 2002)

New Mill Brook Discharge Sta. 25+98

GIVEN:  $R_p = 4.00$  maximum inside pipe rise, ft  
 $S_p = 9.00$  inside dia. of circular sections or max. inside pipe span for non-circular sections (ft)  
 value is based on the sum of both culverts (5'+5')  
 $Q = 247.00$  cfs (use Qfull at 100-year design event)  
 $T_w = 2.97$  ft (at 100 year event)

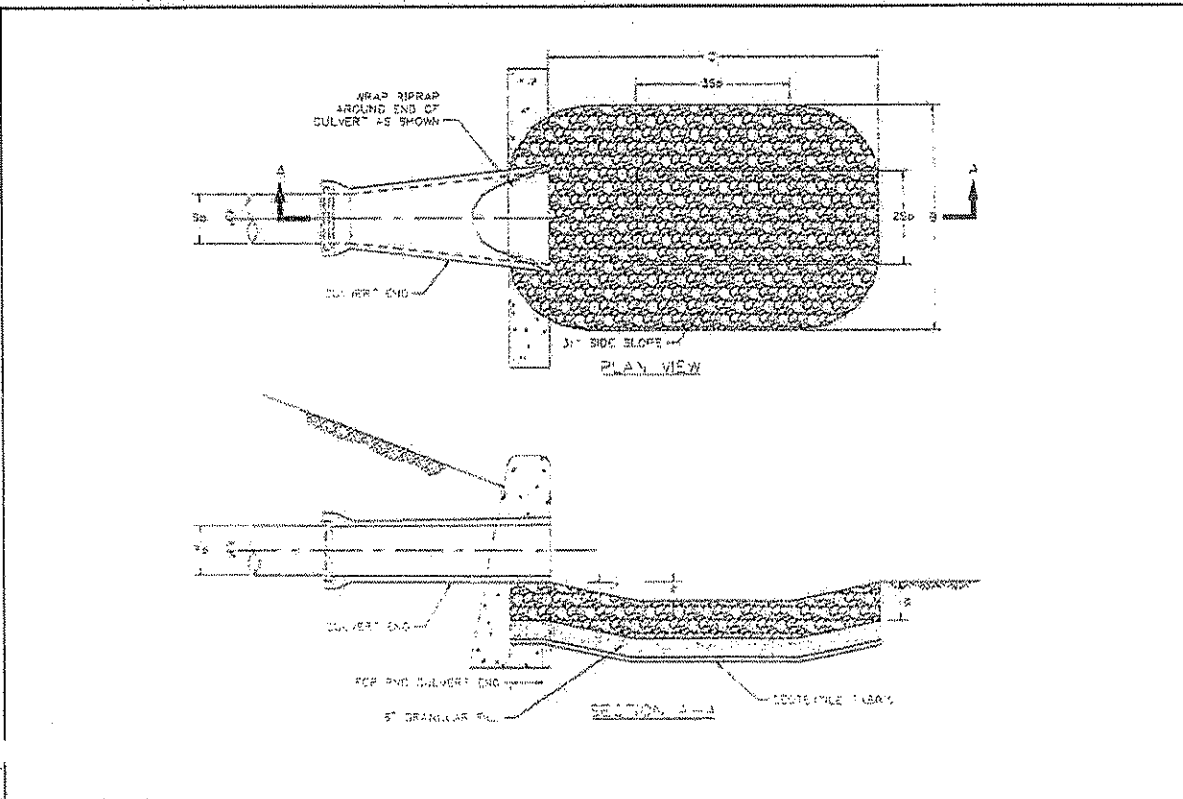
FIND:  $D_{50} = \text{Average Rock Diameter Required}$   
 $D_{50} = ((0.0125 \cdot R_p^2) / T_w) \cdot (Q / (R_p^{2.5}))^{(1.333)} = 1.1 \text{ feet}$   
 $13.2 \text{ inches}$   
 Use:  $15 \text{ inches}$

$F = 0.5 R_p = \text{Basin Depression} = 2 \text{ feet}$   
 $C = 3S_p + 6F = \text{Basin Length} = 39.00 \text{ feet}$   
 $B = 2S_p + 6F = \text{Basin Inlet and Outlet Width} = 30.00 \text{ feet}$

The type of riprap is as follows:

Modified	$d_{50} < 0.13 \text{ m (0.42 ft)}$
Intermediate	$0.13 \text{ m (0.42 ft)} < d_{50} < 0.20 \text{ m (0.67 ft)}$
Standard	$0.20 \text{ m (0.67 ft)} < d_{50} < 0.38 \text{ m (1.25 ft)}$
Special Design	$0.38 \text{ m (1.25 ft)} < d_{50}$

Reference: Report No. FHWA-RD-75-508 ("culvert Outlet Protection Design: computer Program Documentation")



# Calculation Sheet



Project No. 83160.00  
 Subject Route 31 Reconstruction  
 Location Coventry, CT

Calc By B. Sherman  
 Date 2/21/2008  
 Revised 3/26/2009  
 Checked by  
 Date

## PREFORMED SCOUR HOLE TYPE 2 FROM CONNECTICUT DOT DRAINAGE MANUAL (MAY 2002)

New Mill Brook Discharge Sta. 25+98

GIVEN:  $R_p =$  4.00 maximum inside pipe rise, ft  
 $S_c =$  9.00 inside dia. of circular sections or max. inside pipe span for non-circular sections (ft)  
 value is based on the sum of both culverts (5'+5')  
 $Q =$  247.00 cfs (use Qfull at 100-year design event)  
 $T_w =$  2.97 ft (at 100 year event)

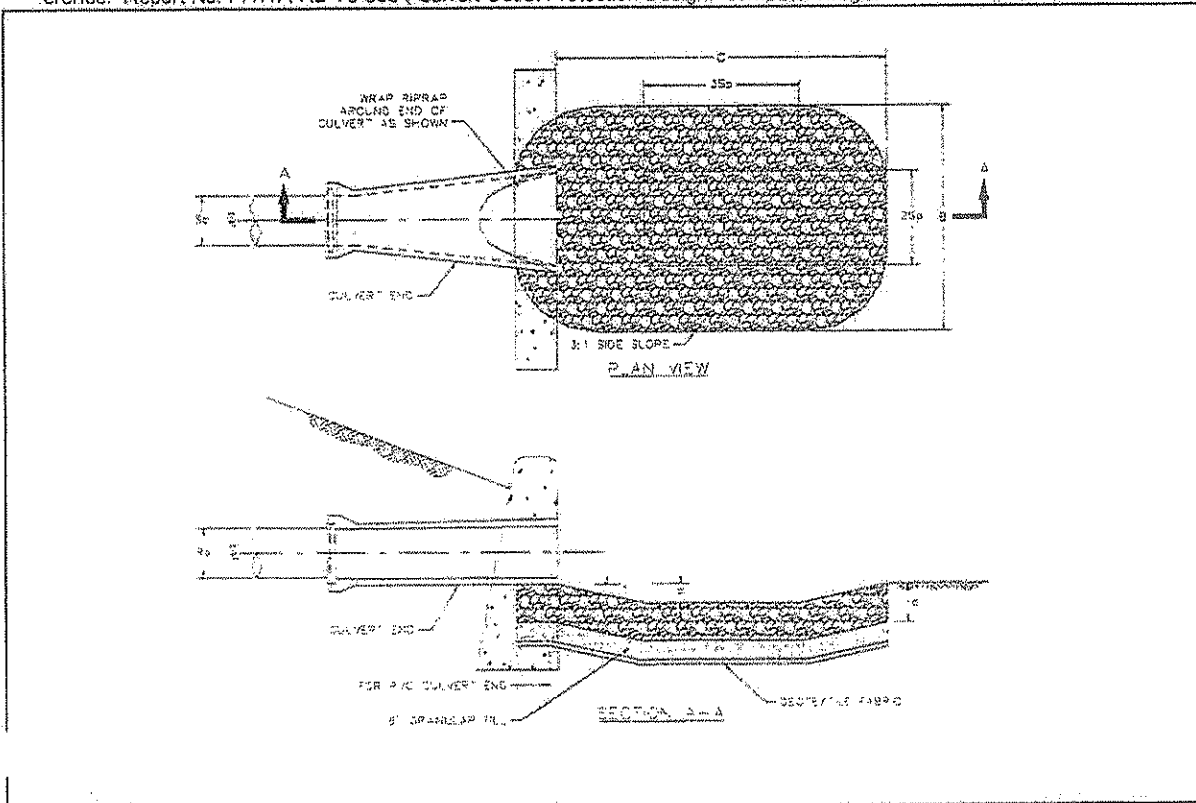
FIND:  $D_{50} =$  Average Rock Diameter Required  
 $D_{50} = ((0.0082 \cdot R_p^2) / T_w) \cdot (Q / (R_p^2 \cdot 2.5))^{1.333} =$  0.7 feet  
 8.4 inches  
 Use: 12 inches

$F =$   $R_p =$  Basin Depression = 4.00 feet  
 $C = 3S_p + 6F =$  Basin Length = 51.00 feet  
 $B = 2S_p + 6F =$  Basin Inlet and Outlet Width = 42.00 feet

The type of riprap is as follows:

Modified	$d_{50} < 0.13$ m (0.42 ft)
Intermediate	$0.13$ m (0.42 ft) $< d_{50} < 0.20$ m (0.67 ft)
Standard	$0.20$ m (0.67 ft) $< d_{50} < 0.38$ m (1.25 ft)
Special Design	$0.38$ m (1.25 ft) $< d_{50}$

Reference: Report No. FHWA-RD-75-508 ("culvert Outlet Protection Design: computer Program Documentation")



# Calculation Sheet



Project No. 83160.00  
 Subject Route 31 Reconstruction  
 Location Coventry, CT

Calc By \_\_\_\_\_  
 Date 3/30/2009  
 Checked by \_\_\_\_\_  
 Date \_\_\_\_\_

**RipRap Basin**

File External View Options Help

Title: 32130 RS2730 HFC Span: 5 ft Fall Water: ☐ 1.490 ft

Shape: Rectangular Velocity (Vo): 15.7 ft/s Reference depth: 1.490 ft

Flow (Q): 17.3 ft³/s Depth (Yo): 1.40 ft Froude (Fr): 2.257

Input

D50: 0.85 ft Max Depth: 0 ft

Output

Basin output

Basin Length (LB): 31.225 ft

Pool Length (LP): 20.817 ft

Apron Length (LA): 10.408 ft

TB: 1.700 ft

TA: 2.550 ft

HS: 2.082 ft

RipRap output

L/De	L	VL/Vo	VL	Rock size D50
	ft		ft/s	ft
10	30.8	0.59	9.22	0.53
15	46.2	0.39	6.17	0.21
20	61.6	0.30	4.65	0.10
25	76.7	0.24	3.74	0.05

Hs/D50: 2.449 Design meets criteria? ☒ Yes

(High Flow Cell)

**RipRap Basin**

File External View Options Help

Title: 32130 RS2730 HFC Span: 4 ft Fall Water: ☐ 3.000 ft

Shape: Rectangular Velocity (Vo): 10.5 ft/s Reference depth: 3.000 ft

Flow (Q): 129.7 ft³/s Depth (Yo): 3 ft Froude (Fr): 1.058

Input

D50: 0.65 ft Max Depth: 0 ft

Output

Basin output

Basin Length (LB): 19.611 ft

Pool Length (LP): 13.074 ft

Apron Length (LA): 6.537 ft

TB: 1.300 ft

TA: 1.950 ft

HS: 1.307 ft

RipRap output

L/De	L	VL/Vo	VL	Rock size D50
	ft		ft/s	ft
10	39.1	0.59	6.17	0.21
15	58.6	0.39	4.13	0.07
20	78.2	0.30	3.11	0.02
25	97.1	0.24	2.50	0.00

Hs/D50: 2.011 Design meets criteria? ☒ Yes

(Low Flow Cell)

**HY-8 RipRap**

File External View Options Help

Title: 42130 RS2730 COMB Span: 9 ft

Shape: Rectangular Velocity (Vo): 13 ft/s

Flow (Q): 247 ft<sup>3</sup>/s Depth (Yo): 2.1 ft

Reference depth: 2.100 ft

Froude (Fr): 1.581

---

**Input**

D50: 0.8 ft Max Depth: 0 ft

---

**Output**

Basin output		RipRap output				
		L/D <sub>e</sub>	L	VL/Vo	VL	Rock size D50
			ft		ft/s	ft
Basin Length (LB)	37.821	10	49.1	0.59	7.64	0.35
Pool Length (LP)	27.000					
Apron Length (LA)	10.821	15	73.6	0.39	5.11	0.13
TB	1.600	20	98.1	0.30	3.85	0.06
TA	2.400	25	103.0	0.24	3.09	0.02
HS	2.164					

Hs/D50: 2.705 Design meets criteria? ☒ Yes

(Approximate Average of High and Low Flow Cells)

Note: Input data for HY-8 RipRap Basin sizing provided by ConnDOT Hydraulic and Drainage section.

# Connecticut Department of Transportation

Project No. \_\_\_\_\_ Prepared by \_\_\_\_\_ Date \_\_\_\_\_  
 Route No. \_\_\_\_\_ Checked by \_\_\_\_\_ Date \_\_\_\_\_  
 Town \_\_\_\_\_ Stream \_\_\_\_\_  
 Discharge 100 YR Unit English

## Riprap Revetment Design Based on HEC-11

$$D_{50} = 0.001 V_a^3 / (d_{avg}^{0.5} K_1^{1.5}) C_{sf}$$

*Average velocity (Va) and Average flow depth(d ave) in main channel*

Cross Section No. RS 2570  $V_a$  (fps)= 7.45  
 Flow Area (sq.ft)= 42.11 Top Width (ft)= 39.53

$d_{avg}$  (ft) = 1.07

Side Slope= 2 : 1

Bank angle (degrees)  
 $\theta =$  26.6

Riprap Class	$\Phi$	$K_1$	$D_{50}$	Acceptable Range	Check
Modified	41.2	0.7342	<b>0.64</b>	$d_{50} < 0.42'$	NG
Intermediate	41.6	0.7391	<b>0.63</b>	$0.42' < d_{50} < 0.67'$	G
Standard	41.8	0.7300	<b>0.64</b>	$0.67' < d_{50} < 1.25'$	G
Other	42	0.7438	<b>0.62</b>	$d_{50} > 1.25'$	

Assumed Specific Gravity of Rock Riprap = 2.65

Angle of Repose (degrees)=  $\Phi$

Bank Stability Factor =  $K_1$

Median riprap particle size (ft) for Stability Factor of 1.2 =  $D_{50}$

use larger Stability Factor if applying at channel bends

### Stability Factors (SF) and Correction Factor ( $C_{sf}$ )

SF	$C_{sf}$	$D_{50} (\Phi = 41.2)$	$D_{50} (\Phi = 41.6)$	$D_{50} (\Phi = 41.8)$	$D_{50}   \Phi = 42$
1.0	0.76	0.48	0.48	0.49	0.48
1.1	0.88	0.56	0.55	0.56	0.55
1.2	1.00	0.64	0.63	0.64	0.62
1.3	1.13	0.72	0.71	0.72	0.70
1.4	1.26	0.80	0.79	0.81	0.79
1.5	1.40	0.89	0.88	0.90	0.87
1.6	1.54	0.98	0.97	0.99	0.96
1.7	1.69	1.07	1.06	1.08	1.05
1.8	1.84	1.17	1.16	1.18	1.15
1.9	1.99	1.27	1.26	1.28	1.24
2.0	2.15	1.37	1.36	1.38	1.34

**Recommendation:** use Intermediate Riprap

# CALCULATION SHEET



PROJECT NO. 70-107-0  
 SUBJECT: Inlet Protection Spring  
 HEC-11 calcs  
 LOCATION: Rte. 31 Reconstruction  
 Conowingo, MD

CALC BY: J. White  
 DATE: 12-18-08  
 CHECKED BY: DEV  
 DATE:

REFER TO

Twin 48"  $\phi$  culverts - Inlet Protection

Size for 50 yr flood  
 $Q_{50} = 68.5 \text{ cfs}$  (prev culvert)  
 $V_{50} = 8.29 \text{ fps}$

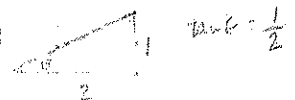
Find:  $D_{50}$  = median riprap particle size  
 $= 0.001 V_a^3 / (d_{avg}^{0.5} K_1^{1.5})$  (6) pg 30

$V_a$  = avg velocity = 8.29 fps  
 $C$  = correction factor = assume 1.0 (based on specific gravity of riprap = 2.65)  
 $d_{avg}$  = avg depth of flow = 454.59 (WS elev from HECRAS @ 1406)  
 451.5 (~bottom of channel)  
 3.0 =  $d_{avg}$

$$K_1 = [1 - (\sin^2 \theta / \sin^2 \phi)]^{0.5} \quad (7) \text{ pg 30}$$

$\theta$  = bank angle w/ horizontal = 26.6° (2:1 slope)

$\phi$  = riprap material  $\angle$  repose = 39°  
 (Chart 4, ~ 1" dia  $D_{50}$ , very angular)



$$K_1 = [1 - (\sin^2(26.6^\circ) / \sin^2(39^\circ))]^{0.5} = 0.703$$

$$D_{50} = 0.001 (8.29 \text{ fps})^3 / ((3.0 \text{ ft})^{0.5} * (0.703)^{1.5}) = \boxed{0.558' \approx 7"} \quad (8)$$

From ConnDOT Spec. use Intermediate Rip Rap  $0.13\text{m} (0.42\text{ft}) \leq d_{50} < 0.24\text{m} (0.67\text{ft})$

Extent of protection (Section 301.1 & 301.2)

Length: 40ft from start of first wingwall to start of 48" pipes

Vertical extent: 456.0ft min. mom (top of bank)

CALC  
 SHEET 1 OF SHEETS

# CALCULATION SHEET



PROJECT NO 83160.00  
 SUBJECT Inlet Protection Sizing  
 HEC-II Calcs  
 LOCATION Rte 31 Reconstruction  
 Coventry, CT

CALC BY J. White  
 DATE 12.18.08  
 CHECKED BY DEV

REFER TO

Layer thickness (4.3)

(a)  $D_{100} = 1.7 D_{50} = 1.7(0.67) = 1.14$  (table 2 p.36) ← larger value  
 or  $1.5 D_{50} = 1.5(0.67) = 1.01$

(b) Not less than 12 in.

(c) Increase by 50% for placement under water - assume NO

∴ Min thickness =  $14 \text{ in} \approx 1.17 \text{ ft}$

Filter Layer (Section 4.4 and Form 3.5)

(a) Filter Material Etc.

$$\frac{D_{15}(\text{coarser layer})}{D_{85}(\text{finer layer})} < 5 < \frac{D_{15}(\text{coarser layer})}{D_{85}(\text{finer layer})} < 40$$

Try 1" uniformly graded coarse gravel filter

$$\frac{0.03}{0.14} = 0.21 < 5 < \frac{0.03}{0.005} = 6 < 40 \checkmark$$

∴ Soil interface ok.

For riprap to filter interface:

$$\frac{D_{15}(\text{riprap})}{D_{85}(\text{filter})} = \frac{0.23}{0.22} = 1.05 < 5 \checkmark$$

$$\frac{D_{15}(\text{riprap})}{D_{15}(\text{filter})} = \frac{0.23}{0.03} = 7.67 < 40 \checkmark$$

∴ 1" filter material is adequate

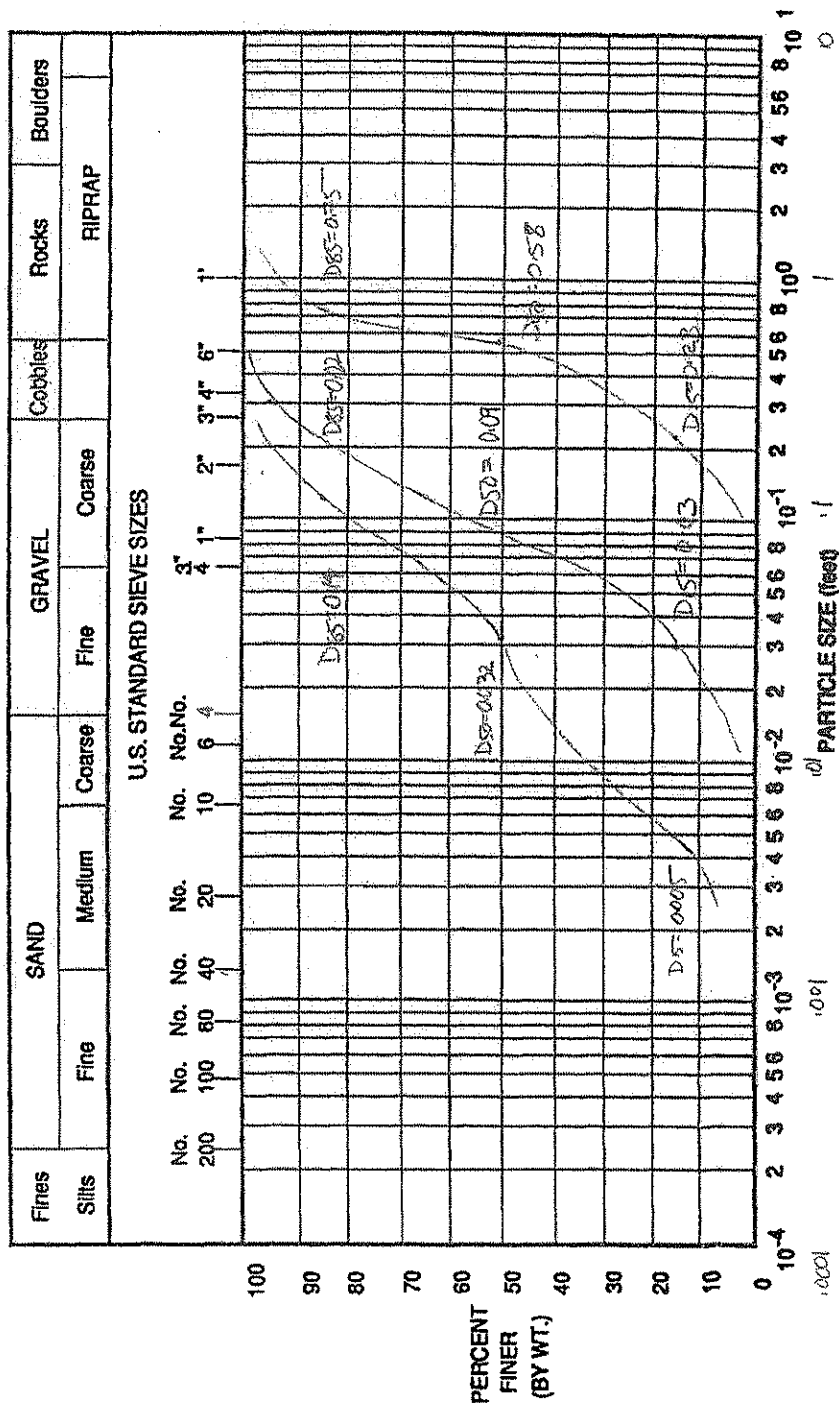
(b) Filter layer thickness

- Use a thickness of  $12 \text{ in}$

Note- designed gravel  
 < 1/4" filter layer. Soil  
 layer properties taken  
 from HEC-II  
 calcs for outlet protec  
 sizing (assumed  
 properties of existing  
 bank soil)

CALC  
 SHEET 2 OF SHEETS





Form 3. Material gradation

PROJECT	No 32 - 130	Prepared by/Date:	12/30/08 JUV
DESCRIPTION	Reconstruction of the 31" Diameter of Inlet Protection of Twin 48" conduits	Checked by/Date:	1
		Sheet	1 of 1

**GRANULAR FILTER:**

LAYER	DESCRIPTION	D <sub>15</sub> (#)	D <sub>85</sub> (#)	RATIO	D <sub>15</sub> COARSE D <sub>85</sub> FINE	< 5 <	D <sub>15</sub> COARSE D <sub>15</sub> FINE	< 40
1	Soil layer	0.005	0.14	$\frac{0.03}{0.14}$	0.21	< 5 <	$\frac{0.03}{0.05}$	6
2	Gravel filter	0.03	0.22	$\frac{0.03}{0.22}$	1.05	< 5 <	$\frac{0.23}{0.23}$	7.67
3	Rip Rap	0.23	0.75					

**SUMMARY:**

LAYER DESCRIPTION	D <sub>15</sub>	D <sub>85</sub>	THICKNESS
gravel filter	0.03	0.22	12"

**FABRIC FILTER:**

**PHYSICAL PROPERTIES CLASS:**

**HYDRAULIC PROPERTIES**

PIPING RESISTANCE < 50% PASSING #200 AOS < 0.6 mm

< 50% PASSING #200 AOS < 0.3 mm

PERMEABILITY SOIL PERMEABILITY < FABRIC PERMEABILITY

SELECTED FABRIC FILTER SPECIFICATIONS:

Form 5. Filter design

**APPENDIX C**  
**Notice of Termination**



# General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities

## Notice of Termination Form

Please complete and submit this form in accordance with the general permit (DEP-PED-GP-015) in order to ensure the proper handling of your termination. Print or type unless otherwise noted.

Note: Ensure that for commercial and industrial facilities, registrations under the *General Permit for the Discharge of Stormwater Associated with Industrial Activity* (DEP-PED-GP-014) or the *General Permit for the Discharge of Stormwater from Commercial Activities* (DEP-PED-GP-004) have been filed where applicable. For questions about the applicability of these general permits, please call the Department at 860-424-3018.

### Part I: Registrant Information

1. Permit number: **GSN**
2. Fill in the name of the registrant(s) as indicated on the registration certificate:  
Registrant:
3. Site Address:  
City/Town: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_
4. Date all storm drainage structures were cleaned of construction sediment:  
Date of Completion of Construction: \_\_\_\_\_  
Date of Last Inspection (must be at least three months after final stabilization pursuant to Section 6(b)(6)(D) of the general permit): \_\_\_\_\_
5. Check the post-construction activities at the site (check all that apply):  
☐ Industrial      ☐ Residential      ☐ Commercial      ☐ Capped Landfill  
☐ Other (describe): \_\_\_\_\_

### Part II: Certification

"I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief. I understand that a false statement made in this document or its attachments may be punishable as a criminal offense, in accordance with Section 22a-6 of the Connecticut General Statutes, pursuant to Section 53a-157b of the Connecticut General Statutes, and in accordance with any other applicable statute."

Signature of Permittee

Date

Name of Permittee (print or type)

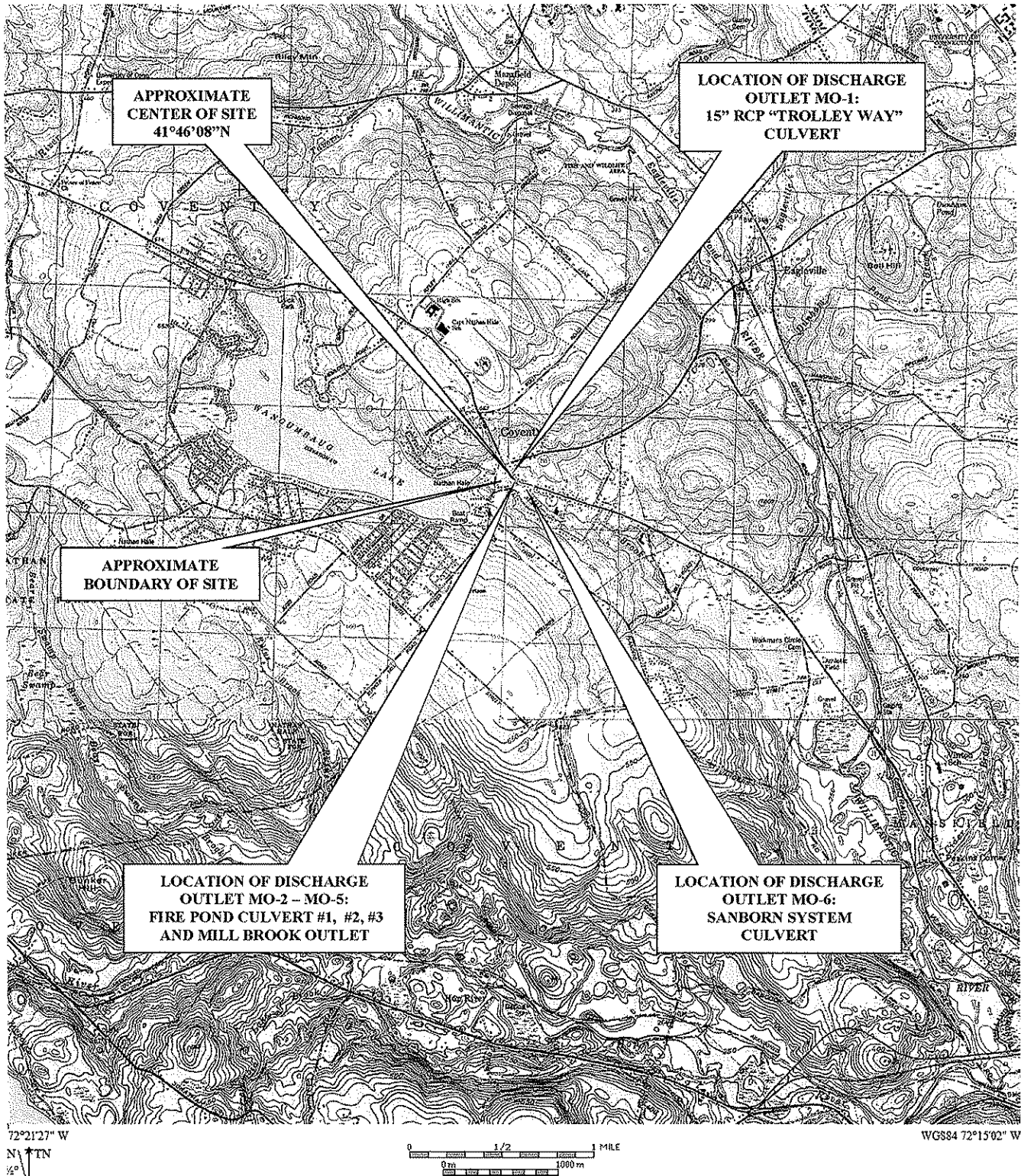
Title (if applicable)

Note: Please submit this Notice of Termination Form to:

STORMWATER PERMIT COORDINATOR  
BUREAU OF WATER MANAGEMENT  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
79 ELM STREET  
HARTFORD, CT 06106-5127

**Attachment 1**  
**Site Location Map**

**Attachment 1**  
**USGS Quadrangle Map: 40 - Coventry**  
**Registrant: Connecticut Department of Transportation**  
***Reconstruction of State Route 31***  
**Coventry, Connecticut**  
**Scale-1:24,000**











## **Attachment 2**

### **Site Plans**

BEGIN MILLING AND OVERLAY  
CUT BITUMINOUS CONCRETE PAVEMENT

END MILLING AND OVERLAY  
BEGIN FULL DEPTH  
RECONSTRUCTION  
STATION 13+50

**LEGEND:**

-  APPROX. CUT SLOPE LIMIT
-  APPROX. FILL SLOPE LIMIT
-  SEDIMENTATION CONTROL INLET PROTECTION
-  TURF ESTABLISHMENT-LAWN
-  PINE BARK MULCH FOR PLANTING
-  CONSERVATION SEEDING
-  SODDING
-  SEDIMENTATION CONTROL SYSTEM

### SOIL LEGEND:

3	RIDGEBURY, LEICESTER, AND WHITMAN SOILS, EXTREMELY STONY
60C	CANTON AND CHARLTON SOILS, 8 TO 15 PERCENT SLOPES
61B	CANTON AND CHARLTON SOILS, 3 TO 8 PERCENT SLOPES, VERY STONY
73E	CHARLTON-CHATFIELD COMPLEX, 15 TO 45 PERCENT SLOPES, VERY ROCKY
306	UDORTHTENTS-URBAN LAND COMPLEX

EROSION AND SEDIMENTATION CONTROL NARRATIVE:

THIS PROJECT IS EXEMPT FROM LOCAL PERMITTING AND DISTURBS 4.97 ACRES, WHICH SURPASSES THE THRESHOLD FOR REGISTRATION OF A GENERAL PERMIT FOR THE DISCHARGE OF STORMWATER AND DEWATERING WASTEWATER FROM CONSTRUCTION ACTIVITIES THROUGH CONNECTICUT D.E.E.P.

THE EXISTING SITE CONSISTS OF TEMPORARY PAVED STREETS, SIDEWALKS AND PAVED PARKING LOTS WITH GREATER THAN 40% IMPERVIOUS COVER, WHICH TRIGGERS THE PERMIT RECOMMENDATION TO STORE ONE-HALF THE WATER QUALITY VOLUME (WQV). HOWEVER, AS PART OF THE RECONSTRUCTION PROJECT, THE TOTAL EFFECTIVE IMPERVIOUS COVER WILL NOT BE INCREASED. AS A RESULT, ONSITE RETENTION OF ONE-HALF OF THE WATER QUALITY VOLUME IS NOT REQUIRED PER GENERAL PERMIT SECTION 5(b)(2)(C)(i)(a). STORMWATER QUALITY TREATMENT WILL BE ACHIEVED USING DEEP SUMP CATCH BASINS. ALL OFFSITE DISCHARGE LOCATIONS ARE DESIGNED INCLUDING VELOCITY DISSIPATING OUTLET PROTECTION PADS OR SCOUR HOLES.




EROSION AND SEDIMENTATION CONTROL NOTES:

1. THE NARRATIVE PROVIDED IN THE STORMWATER POLLUTION CONTROL PERMIT IS PART OF THE EROSION CONTROL REQUIREMENTS, WHICH THE CONTRACTOR SHALL FOLLOW ALONG WITH THE "2002 CT E&S GUIDELINES".
2. THE EROSION AND SEDIMENT CONTROL PLANS REQUIRE THAT THE DOWNSTREAM SLOPE LIMITS WITHIN THE PROJECT BE PROTECTED WITH SEDIMENTATION CONTROL SYSTEM (SCS), WHICH SHALL BE IN PLACE PRIOR TO THE START OF ANY CONSTRUCTION WITHIN THAT PHASE. THE SCS MUST BE IN ACCORDANCE WITH THE CTDEEP'S 2002 CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL AND THE 2004 CONNECTICUT STORMWATER QUALITY MANUAL (THE MATERIALS/PRODUCTS USED IN THE SCS SHALL BE AT THE DISCRETION OF THE CONTRACTOR AND AS APPROVED BY THE ENGINEER). THOSE SYSTEMS ARE TO BE MAINTAINED THROUGHOUT THE ENTIRE CONSTRUCTION PERIOD, OR UNTIL DISTURBED AREAS/SLOPES ARE FULLY STABILIZED, WHICHEVER IS LONGER. ALL STORM WATER OUTFALLS, AND CULVERTS, ARE TO BE CONSTRUCTED FROM DOWNSTREAM TO UPSTREAM, COMMENCING ONLY AFTER PLACEMENT OF THE REQUIRED SCS ACROSS THE DISCHARGE POINT OR OTHER TECHNIQUES NOTED, AND THE TEMPORARY DIVERSION OF ANY EXISTING FLOW, TO THE SATISFACTION OF THE PROJECT ENGINEER.
3. THE DESIGN OF THE PROJECT STORM DRAINAGE SYSTEMS CONFORMS TO THE CONNDOT DRAINAGE MANUAL AND "ONSITE MITIGATION FOR CONSTRUCTION ACTIVITIES". OUTLET PROTECTION AND CHANNEL PROTECTION HAS BEEN INCLUDED WITHIN EACH SYSTEM DESIGN. TEMPORARY CONDITIONS SHALL FOLLOW THE SAME CRITERIA.
4. WHERE CONSTRUCTION ACTIVITIES HAVE BEEN PERMANENTLY HALTED, OR HAVE BEEN TEMPORARILY SUSPENDED FOR MORE THAN SEVEN (7) DAYS, OR WHEN FINAL GRADES HAVE BEEN ACHIEVED IN ANY PORTION OF THE PROJECT, THE CONTRACTOR SHALL IMPLEMENT STABILIZATION PRACTICES WITHIN THREE (3) DAYS. AREAS THAT WILL REMAIN DISTURBED AND INACTIVE FOR AT LEAST THIRTY (30) DAYS SHALL RECEIVE TURF ESTABLISHMENT.

5. AREAS OF LARGE CUTS AND FILLS MUST BE TEMPORARILY STABILIZED EVERY FIFTEEN (15) FEET OF DISTURBED SLOPE. THIS STABILIZATION MUST BE ACHIEVED BEFORE CONTINUING WITH THE CUT OR FILL BEYOND THE FIFTEEN (15) FEET.
6. ALL PAVED AREAS ADJACENT TO THE PROJECT LIMITS, WHERE CONSTRUCTION IS OCCURRING, SHALL BE SWEEPED DAILY TO REMOVE EXCESS MUD, DIRT OR ROCK TRACKING FROM THE PROJECT. DUMP TRUCKS HAULING MATERIAL FROM THE PROJECT MUST BE COVERED WITH A TARPULIN. ANTI-TRACKING PADS SHALL BE PLACED, AND MAINTAINED, AT ALL POINTS OF ACCESS AND EGRESS TO PAVED AREAS.
7. THE FOLLOWING PERMITS HAVE BEEN OBTAINED FOR THE PROJECT AND ARE INCORPORATED INTO THE CONTRACT DOCUMENTS:  
U.S. ARMY CORPS OF ENGINEERS- SECTION 404- CONNECTICUT GENERAL PERMIT - CATEGORY 2  
CONNECTICUT DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION (CT DEEP) GENERAL PERMIT FOR THE DISCHARGE OF STORM WATER AND DEWATERING WASTEWATER ASSOCIATED WITH CONSTRUCTION ACTIVITIES  
CT DEEP FLOOD MANAGEMENT CERTIFICATION  
CT DEEP INLAND WETLAND AND WATERCOURSES PERMIT  
CT DEEP 401 WATER QUALITY CERTIFICATION
8. ALL DRAINAGE STRUCTURES SHALL BE CLEANED WITHIN THE PROJECT LIMITS AND ALL SILT FENCE SHALL BE REMOVED PRIOR TO THE FILING OF THE NOTICE OF TERMINATION IN ACCORDANCE WITH THE GENERAL PERMIT.
9. NO STAGING, STORING OF EQUIPMENT OR MATERIAL SHALL OCCUR WITHIN THE 100-YEAR FLOOD LIMITS.
10. THE CONSTRUCTION SITE SHALL BE CLEAN, WITHOUT ANY ACCUMULATION OF RUBBISH OR CONSTRUCTION DEBRIS IN ACCORDANCE WITH SWPCP SECTION 6.1. PROPER SANITARY DEVICES SHALL BE MAINTAINED ON-SITE AT ALL TIMES. ALL NECESSARY PRECAUTIONS SHALL BE OBSERVED TO AVOID THE SPILLAGE OF FUEL OR OTHER POLLUTANTS ON THE CONSTRUCTION SITE, AS WELL AS THE ADHERENCE TO ALL APPLICABLE POLICIES AND REGULATIONS RELATED TO SPILL PREVENTION AND RESPONSE.
11. DESIGNATE A "WASHOUT" AREA ON THE SITE IN ACCORDANCE WITH SWPCP SECTION 6.2.

## FINAL DESIGN REVIEW

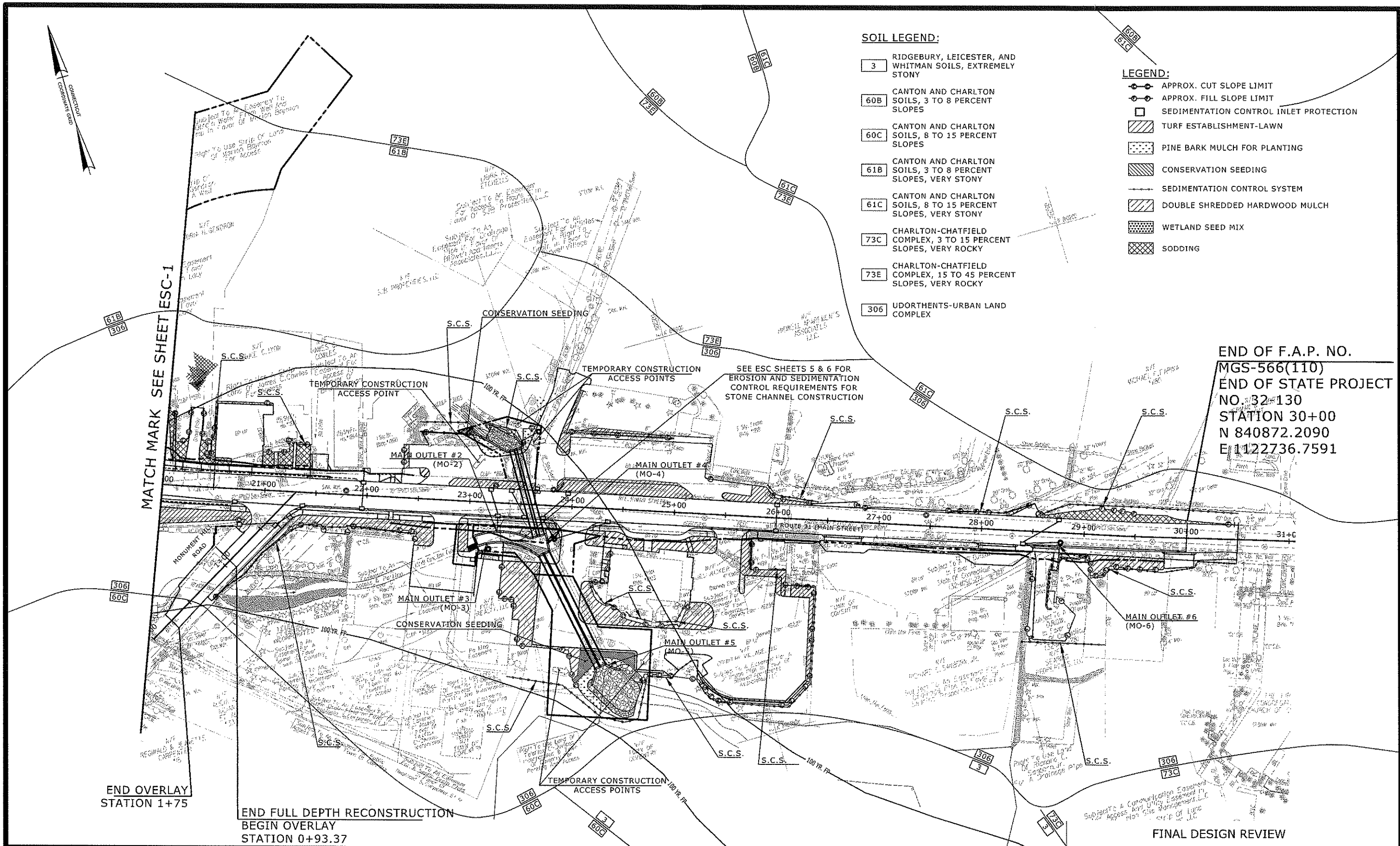
[illegible]

DESIGNER/DRAWER: PJB-MSR / MSR		<b>STATE OF CONNECTICUT</b> DEPARTMENT OF TRANSPORTATION	
CHECKED BY: PJB			
SCALE IN FEET 		ENGINEER: SSC GROUP	
SCALE 1" = 40'		APPROVED BY: _____ DATE: _____	

PROJECT TITLE:

RECONSTRUCTION OF ROUTE 31

TOWN:	COVENTRY	PROJECT NO. <b>32-130</b>
DRAWING TITLE:	EROSION AND SEDIMENTATION CONTROL PLAN	DRAWING NO. <b>ESC-1</b>
		SHEET NO. <b>51</b>



**SOIL LEGEND:**

- 3 RIDGEBURY, LEICESTER, AND WHITMAN SOILS, EXTREMELY STONY
- 60B CANTON AND CHARLTON SOILS, 3 TO 8 PERCENT SLOPES
- 60C CANTON AND CHARLTON SOILS, 8 TO 15 PERCENT SLOPES
- 61B CANTON AND CHARLTON SOILS, 3 TO 8 PERCENT SLOPES, VERY STONY
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- 73C CHARLTON-CHATFIELD COMPLEX, 3 TO 15 PERCENT SLOPES, VERY ROCKY
- 73E CHARLTON-CHATFIELD COMPLEX, 15 TO 45 PERCENT SLOPES, VERY ROCKY
- 306 UDORTHENTS-URBAN LAND COMPLEX

**LEGEND:**

- APPROX. CUT SLOPE LIMIT
- APPROX. FILL SLOPE LIMIT
- SEDIMENTATION CONTROL INLET PROTECTION
- TURF ESTABLISHMENT-LAWN
- PINE BARK MULCH FOR PLANTING
- CONSERVATION SEEDING
- SEDIMENTATION CONTROL SYSTEM
- DOUBLE SHREDDED HARDWOOD MULCH
- WETLAND SEED MIX
- SODDING

END OF F.A.P. NO.  
MGS-566(110)  
END OF STATE PROJECT  
NO. 32-130  
STATION 30+00  
N 840872.2090  
E 1122736.7591

END OVERLAY  
STATION 1+75

END FULL DEPTH RECONSTRUCTION  
BEGIN OVERLAY  
STATION 0+93.37

FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

DESIGNER/DRAFTER:  
PJB-MSR / MSR  
CHECKED BY:  
PJB

SCALE IN FEET  
0 40 80  
SCALE 1"=40'

STATE OF CONNECTICUT  
DEPARTMENT OF TRANSPORTATION  
ENGINEER: BSC GROUP  
APPROVED BY: DATE:

PROJECT TITLE:

RECONSTRUCTION OF ROUTE 31

TOWN:

COVENTRY

DRAWING TITLE:  
EROSION AND SEDIMENTATION  
CONTROL PLAN

PROJECT NO.  
32-130  
DRAWING NO.  
ESC-2  
SHEET NO.  
52